

SEQUENCE LISTING

<110> MUTABILIS

<120> Comprising of polypeptides specific to pathogenic strains and their use as vaccines and in immunotherapy

<130> 2209

<160> 160

<170> PatentIn version 3.1

<210> 1

<211> 163

<212> PRT

<213> Escherichia coli

<400> 1

15 Met Lys Leu Lys Ala Ile Ile Leu Ala Thr Gly Leu Ile Asn Cys
 Ile
 1 5 10 15

20 Val Phe Ser Ala Gln Ala Val Asp Thr Thr Ile Thr Val Thr Gly
 Asn
 20 25 30

25 Val Leu Gln Arg Thr Cys Asn Val Pro Gly Asn Val Asp Val Ser
 Leu
 35 40 45

30 Gly Asn Leu Tyr Val Ser Asp Phe Pro Asn Ala Gly Ser Gly Ser
 Pro
 50 55 60

35 Trp Val Asn Phe Asp Leu Ser Leu Thr Gly Cys Gln Asn Met Asn
 Thr
 65 70 75 80

40 Val Arg Ala Thr Phe Ser Gly Thr Ala Asp Gly Gln Thr Tyr Tyr
 Ala
 85 90 95

45 Asn Thr Gly Asn Ala Gly Gly Ile Lys Ile Glu Ile Gln Asp Arg
 Asp
 100 105 110

50 Gly Ser Asn Ala Ser Tyr His Asn Gly Met Phe Lys Thr Leu Asn
 Val

115

120

125

5 Gln Asn Asn Asn Ala Thr Phe Asn Leu Lys Ala Arg Ala Val Ser
Lys
130 135 140

10 Gly Gln Val Thr Pro Gly Asn Ile Ser Ser Val Ile Thr Val Thr
Tyr
145 150 155
160

15 Thr Tyr Ala

20 <210> 2
<211> 673
<212> PRT
<213> Escherichia coli
<400> 2

25 Met Lys Met Thr Arg Leu Tyr Pro Leu Ala Leu Gly Gly Leu Leu
Leu
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30 Pro Ala Ile Ala Asn Ala Gln Thr Ser Gln Gln Asp Glu Ser Thr
Leu
20 25 30

35 Val Val Thr Ala Ser Lys Gln Ser Ser Arg Ser Ala Ser Ala Asn
Asn
35 40 45

40 Val Ser Ser Thr Val Val Ser Ala Pro Glu Leu Ser Asp Ala Gly
Val
50 55 60

45 Thr Ala Ser Asp Lys Leu Pro Arg Val Leu Pro Gly Leu Asn Ile
Glu
65 70 75 80

50 Asn Ser Gly Asn Met Leu Phe Ser Thr Ile Ser Leu Arg Gly Val
Ser

	85	90	95
5	Ser Ala Gln Asp Phe Tyr Asn Pro Ala Val Thr Leu Tyr Val Asp Gly	100	105 110
10	Val Pro Gln Leu Ser Thr Asn Thr Ile Gln Ala Leu Thr Asp Val Gln	115	120 125
15	Ser Val Glu Leu Leu Arg Gly Pro Gln Gly Thr Leu Tyr Gly Lys Ser	130	135 140
20	Ala Gln Gly Gly Ile Ile Asn Ile Val Thr Gln Gln Pro Asp Ser Thr	145 150	155 160
25	Pro Arg Gly Tyr Ile Glu Gly Gly Val Ser Ser Arg Asp Ser Tyr Arg	165	170 175
30	Ser Lys Phe Asn Leu Ser Gly Pro Ile Gln Asp Gly Leu Leu Tyr Gly	180	185 190
35	Ser Val Thr Leu Leu Arg Gln Val Asp Asp Gly Asp Met Ile Asn Pro	195	200 205
40	Ala Thr Gly Ser Asp Asp Leu Gly Gly Thr Arg Ala Ser Ile Gly Asn	210	215 220
45	Val Lys Leu Arg Leu Ala Pro Asp Asp Gln Pro Trp Glu Met Gly Phe	225 230	235 240

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Ile Asn Gly Asn Val Ile Arg Ser Glu Phe Thr Asn Asp Ser Glu
Leu
545 550 555
560

Tyr His Gly Asn Arg Val Pro Phe Val Pro Arg Tyr Gly Ala Gly
 Ser
 5 565 570 575

Ser Val Asn Gly Val Ile Asp Thr Arg Tyr Gly Ala Leu Met Pro
 Arg
 10 580 585 590

Leu Ala Val Asn Leu Val Gly Pro His Tyr Phe Asp Gly Asp Asn
 Gln
 15 595 600 605

Leu Arg Gln Gly Thr Tyr Ala Thr Leu Asp Ser Ser Leu Gly Trp
 Gln
 20 610 615 620

Ala Thr Glu Arg Met Asn Ile Ser Val Tyr Val Asp Asn Leu Phe
 Asp
 25 625 630 635
 640

Arg Arg Tyr Arg Thr Tyr Gly Tyr Met Asn Gly Ser Ser Ala Val
 Ala
 30 645 650 655

Gln Val Asn Met Gly Arg Thr Val Gly Ile Asn Thr Arg Ile Asp
 Phe
 35 660 665 670

Phe
 40

<210> 3
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 45 <212> PRT
 <213> Escherichia coli
 <400> 3

Met Asn Lys Val Phe Val Val Ser Val Val Ala Ala Ala Cys Val
 Phe
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10	Gly Lys Ala Gly Ala Ser Val Met Ser Leu Ser Asp Gln Arg Phe Leu	35	40	45
15	Ser Gly Asp Glu Glu Glu Thr Ser Lys Tyr Lys Gly Gly Asp Asp His	50	55	60
20	Asp Thr Val Phe Ser Gly Gly Ile Ala Val Gly Tyr Asp Phe Tyr Pro	65	70	75 80
25	Gln Phe Ser Ile Pro Val Arg Thr Glu Leu Glu Phe Tyr Ala Arg Gly	85	90	95
30	Lys Ala Asp Ser Lys Tyr Asn Val Asp Lys Asp Ser Trp Ser Gly Gly	100	105	110
35	Tyr Trp Arg Asp Asp Leu Lys Asn Glu Val Ser Val Asn Thr Leu Met	115	120	125
40	Leu Asn Ala Tyr Tyr Asp Phe Arg Asn Asp Ser Ala Phe Thr Pro Trp	130	135	140
45	Val Ser Ala Gly Ile Gly Tyr Ala Arg Ile His Gln Lys Thr Thr Gly	145	150	155
50	Ile Ser Thr Trp Asp Tyr Glu Tyr Gly Ser Ser Gly Arg Glu Ser Leu	165	170	175

Ser Arg Ser Gly Ser Ala Asp Asn Phe Ala Trp Ser Leu Gly Ala
 Gly
 5 180 185 190

Val Arg Tyr Asp Val Thr Pro Asp Ile Ala Leu Asp Leu Ser Tyr
 Arg
 10 195 200 205

Tyr Leu Asp Ala Gly Asp Ser Ser Val Ser Tyr Lys Asp Glu Trp
 Gly
 15 210 215 220

Asp Lys Tyr Lys Ser Glu Val Asp Val Lys Ser His Asp Ile Met
 Leu
 20 225 230 235
 240

Gly Met Thr Tyr Asn Phe
 25 245

<210> 4
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 30 <212> PRT
 <213> Escherichia coli
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Met Lys Leu Lys Ala Ile Ile Leu Ala Thr Gly Leu Ile Asn Cys
 Ile
 35 1 5 10 15

Ala Phe Ser Ala Gln Ala Val Asp Thr Thr Ile Thr Val Thr Gly
 Arg
 40 20 25 30

Val Leu Pro Arg Thr Cys Thr Ile Gly Asn Gly Gly Asn Pro Asn
 Ala
 45 35 40 45

Thr Val Val Leu Asp Asn Ala Tyr Thr Ser Asp Leu Ile Ala Ala
 Asn
 50 50 55 60

Ser Thr Ser Gln Trp Lys Asn Phe Ser Leu Thr Leu Thr Asn Cys
 Gln
 5 65 70 75 80

Asn Val Asn Asn Val Thr Ser Phe Gly Gly Thr Ala Glu Asn Thr
 Asn
 10 85 90 95

Tyr Tyr Arg Asn Thr Gly Asp Ala Thr Asn Ile Met Val Glu Leu
 Gln
 15 100 105 110

Glu Gln Gly Asn Gly Asn Thr Pro Leu Lys Val Gly Ser Thr Lys
 Val
 20 115 120 125

Val Thr Val Ser Asn Gly Gln Ala Thr Phe Asn Leu Lys Val Arg
 Ala
 25 130 135 140

Val Ser Lys Gly Asn Ala Gly Ala Gly Ser Ile Asn Ser Gln Ile
 Thr
 30 145 150 155
 160

Val Thr Tyr Thr Tyr Ala
 35 165

<210> 5
 <211> 1295
 40 <212> PRT
 <213> Escherichia coli
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Met Asn Lys Ile Tyr Ser Leu Lys Tyr Ser Ala Ala Thr Gly Gly
 Leu
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Ile Ala Val Ser Glu Leu Ala Lys Arg Val Ser Gly Lys Thr Asn
 50 Arg
 20 25 30

5	Lys Leu Val Ala Thr Met Leu Ser Leu Ala Val Ala Gly Thr Val Asn	35	40	45
10	Ala Ala Asn Ile Asp Ile Ser Asn Val Trp Ala Arg Asp Tyr Leu Asp	50	55	60
15	Leu Ala Gln Asn Lys Gly Ile Phe Gln Pro Gly Ala Thr Asp Val Thr	65	70	75 80
20	Ile Thr Leu Lys Asn Gly Asp Lys Phe Ser Phe His Asn Leu Ser Ile	85	90	95
25	Pro Asp Phe Ser Gly Ala Ala Ala Ser Gly Ala Ala Thr Ala Ile Gly	100	105	110
30	Gly Ser Tyr Ser Val Thr Val Ala His Asn Lys Lys Asn Pro Gln Ala	115	120	125
35	Ala Glu Thr Gln Val Tyr Ala Gln Ser Ser Tyr Arg Val Val Asp Arg	130	135	140
40	Arg Asn Ser Asn Asp Phe Glu Ile Gln Arg Leu Asn Lys Phe Val Val	145	150	155
		160		
45	Glu Thr Val Gly Ala Thr Pro Ala Glu Thr Asn Pro Thr Thr Tyr Ser	165	170	175
50	Asp Ala Leu Glu Arg Tyr Gly Ile Val Thr Ser Asp Gly Ser Lys Lys	180	185	190

5	Ile Ile Gly Phe Arg Ala Gly Ser Gly Gly Thr Ser Phe Ile Asn Gly	195	200	205
10	Glu Ser Lys Ile Ser Thr Asn Ser Ala Tyr Ser His Asp Leu Leu Ser	210	215	220
15	Ala Ser Leu Phe Glu Val Thr Gln Trp Asp Ser Tyr Gly Met Met Ile	225 240	230	235
20	Tyr Lys Asn Asp Lys Thr Phe Arg Asn Leu Glu Ile Phe Gly Asp Ser	245	250	255
25	Gly Ser Gly Ala Tyr Leu Tyr Asp Asn Lys Leu Glu Lys Trp Val Leu	260	265	270
30	Val Gly Thr Thr His Gly Ile Ala Ser Val Asn Gly Asp Gln Leu Thr	275	280	285
35	Trp Ile Thr Lys Tyr Asn Asp Lys Leu Val Ser Glu Leu Lys Asp Thr	290	295	300
40	Tyr Ser His Lys Ile Asn Leu Asn Gly Asn Asn Val Thr Ile Lys Asn	305 320	310	315
45	Thr Asp Ile Thr Leu His Gln Asn Asn Ala Asp Thr Thr Gly Thr Gln	325	330	335
50	Glu Lys Ile Thr Lys Asp Lys Asp Ile Val Phe Thr Asn Gly Gly Asp			

	340		345		350
5	Val Leu Phe Lys Asp Asn Leu Asp Phe Gly Ser Gly Gly Ile Ile Phe	355	360	365	
10	Asp Glu Gly His Glu Tyr Asn Ile Asn Gly Gln Gly Phe Thr Phe Lys	370	375	380	
15	Gly Ala Gly Ile Asp Ile Gly Lys Glu Ser Ile Val Asn Trp Asn Ala 385 400	390	395		
20	Leu Tyr Ser Ser Asp Asp Val Leu His Lys Ile Gly Pro Gly Thr Leu	405	410	415	
25	Asn Val Gln Lys Lys Gln Gly Ala Asn Ile Lys Ile Gly Glu Gly Asn	420	425	430	
30	Val Ile Leu Asn Glu Glu Gly Thr Phe Asn Asn Ile Tyr Leu Ala Ser	435	440	445	
35	Gly Asn Gly Lys Val Ile Leu Asn Lys Asp Asn Ser Leu Gly Asn Asp	450	455	460	
40	Gln Tyr Ala Gly Ile Phe Phe Thr Lys Arg Gly Gly Thr Leu Asp Leu 465 480	470	475		
45	Asn Gly His Asn Gln Thr Phe Thr Arg Ile Ala Ala Thr Asp Asp Gly	485	490	495	
50					

	Thr	Thr	Ile	Thr	Asn	Ser	Asp	Thr	Thr	Lys	Glu	Ala	Val	Leu	Ala
	Ile														
				500					505					510	
5	Asn	Asn	Glu	Asp	Ser	Tyr	Ile	Tyr	His	Gly	Asn	Ile	Asn	Gly	Asn
	Ile														
			515					520					525		
10	Lys	Leu	Thr	His	Asn	Ile	Asn	Ser	Gln	Asp	Lys	Lys	Thr	Asn	Ala
	Lys														
		530						535					540		
15	Leu	Ile	Leu	Asp	Gly	Ser	Val	Asn	Thr	Lys	Asn	Asp	Val	Glu	Val
	Ser														
	545					550					555				
	560														
20	Asn	Ala	Ser	Leu	Thr	Met	Gln	Gly	His	Ala	Thr	Glu	His	Ala	Ile
	Phe														
				565						570				575	
25	Arg	Ser	Ser	Ala	Asn	His	Cys	Ser	Leu	Val	Phe	Leu	Cys	Gly	Thr
	Asp														
				580					585					590	
30	Trp	Val	Thr	Val	Leu	Lys	Glu	Thr	Glu	Ser	Ser	Tyr	Asn	Lys	Lys
	Phe														
			595					600					605		
35	Asn	Ser	Asp	Tyr	Lys	Ser	Asn	Asn	Gln	Gln	Thr	Ser	Phe	Asp	Gln
	Pro														
		610					615					620			
40	Asp	Trp	Lys	Thr	Gly	Val	Phe	Lys	Phe	Asp	Thr	Leu	His	Leu	Asn
	Asn														
	625					630				635					
45	640														
	Ala	Asp	Phe	Ser	Ile	Ser	Arg	Asn	Ala	Asn	Val	Glu	Gly	Asn	Ile
	Ser														
50					645					650				655	

	Ala Asn Lys Ser Ala Ile Thr Ile Gly Asp Lys Asn Val Tyr Ile		
	Asp		
5	660	665	670
	Asn Leu Ala Gly Lys Asn Ile Thr Asn Asn Gly Phe Asp Phe Lys		
	Gln		
10	675	680	685
	Thr Ile Ser Thr Asn Leu Ser Ile Gly Glu Thr Lys Phe Thr Gly		
	Gly		
15	690	695	700
	Ile Thr Ala His Asn Ser Gln Ile Ala Ile Gly Asp Gln Ala Val		
	Val		
20	705	710	715
	720		
	Thr Leu Asn Gly Ala Thr Phe Leu Asp Asn Thr Pro Ile Ser Ile		
	Asp		
25	725	730	735
	Lys Gly Ala Lys Val Ile Ala Gln Asn Ser Met Phe Thr Thr Lys		
	Gly		
30	740	745	750
	Ile Asp Ile Ser Gly Glu Leu Thr Met Met Gly Ile Pro Glu Gln		
	Asn		
35	755	760	765
	Ser Lys Thr Val Thr Pro Gly Leu His Tyr Ala Ala Asp Gly Phe		
	Arg		
40	770	775	780
	Leu Ser Gly Gly Asn Ala Asn Phe Ile Ala Arg Asn Met Ala Ser		
	Val		
45	785	790	795
	800		
	Thr Gly Asn Ile Tyr Ala Asp Asp Ala Ala Thr Ile Thr Leu Gly		
	Gln		
50	805	810	815

5	Pro Glu Thr Glu Thr Pro Thr Ile Ser Ser Ala Tyr Gln Ala Trp Ala	820	825	830
10	Glu Thr Leu Leu Tyr Gly Phe Asp Thr Ala Tyr Arg Gly Ala Ile Thr	835	840	845
15	Ala Pro Lys Ala Thr Val Ser Met Asn Asn Ala Ile Trp His Leu Asn	850	855	860
20	Ser Gln Ser Ser Ile Asn Arg Leu Glu Thr Lys Asp Ser Met Val Arg 865 880	870	875	
25	Phe Thr Gly Asp Asn Gly Lys Phe Thr Thr Leu Thr Val Asn Asn Leu	885	890	895
30	Thr Ile Asp Asp Ser Ala Phe Val Leu Arg Ala Asn Leu Ala Gln Ala	900	905	910
35	Asp Gln Leu Val Val Asn Lys Ser Leu Ser Gly Lys Asn Asn Leu Leu	915	920	925
40	Leu Val Asp Phe Ile Glu Lys Asn Gly Asn Ser Asn Gly Leu Asn Ile	930	935	940
45	Asp Leu Val Ser Ala Pro Lys Gly Thr Ala Val Asp Val Phe Lys Ala 945 960	950	955	
50	Thr Thr Arg Ser Ile Gly Phe Ser Asp Val Thr Pro Val Ile Glu Gln			

965

970

975

5	Lys	Asn	Asp	Thr	Asp	Lys	Ala	Thr	Trp	Thr	Leu	Ile	Gly	Tyr	Lys			
	Ser																	
																980	985	990
10	Val	Ala	Asn	Ala	Asp	Ala	Ala	Lys	Lys	Ala	Thr	Leu	Leu	Met	Ser			
	Gly																	
																995	1000	1005
15	Gly	Tyr	Lys	Ala	Phe	Leu	Ala	Glu	Val	Asn	Asn	Leu	Asn	Lys	Arg			
		1010					1015					1020						
20	Met	Gly	Asp	Leu	Arg	Asp	Ile	Asn	Gly	Glu	Ser	Gly	Ala	Trp	Ala			
		1025					1030					1035						
25	Arg	Ile	Ile	Ser	Gly	Thr	Gly	Ser	Ala	Gly	Gly	Gly	Phe	Ser	Asp			
		1040					1045					1050						
30	Asn	Tyr	Thr	His	Val	Gln	Val	Gly	Ala	Asp	Asn	Lys	His	Glu	Leu			
		1055					1060					1065						
35	Asp	Gly	Leu	Asp	Leu	Phe	Thr	Gly	Val	Thr	Met	Thr	Tyr	Thr	Asp			
		1070					1075					1080						
40	Ser	His	Ala	Gly	Ser	Asp	Ala	Phe	Ser	Gly	Glu	Thr	Lys	Ser	Val			
		1085					1090					1095						
45	Gly	Ala	Gly	Leu	Tyr	Ala	Ser	Ala	Met	Phe	Glu	Ser	Gly	Ala	Tyr			
		1100					1105					1110						
50	Ile	Asp	Leu	Ile	Gly	Lys	Tyr	Val	His	His	Asp	Asn	Glu	Tyr	Thr			
		1115					1120					1125						
55	Ala	Thr	Phe	Ala	Gly	Leu	Gly	Thr	Arg	Asp	Tyr	Ser	Ser	His	Ser			
		1130					1135					1140						
60	Trp	Tyr	Ala	Gly	Ala	Glu	Val	Gly	Tyr	Arg	Tyr	His	Val	Thr	Asp			
		1145					1150					1155						

5 Ser Ala Trp Ile Glu Pro Gln Ala Glu Leu Val Tyr Gly Ala Val
 1160 1165 1170
 Ser Gly Lys Gln Phe Ser Trp Lys Asp Gln Gly Met Asn Leu Thr
 1175 1180 1185
 10 Met Lys Asp Lys Asp Phe Asn Pro Leu Ile Gly Arg Thr Gly Val
 1190 1195 1200
 15 Asp Val Gly Lys Ser Phe Ser Gly Lys Asp Trp Lys Val Thr Ala
 1205 1210 1215
 20 Arg Ala Gly Leu Gly Tyr Gln Phe Asp Leu Phe Ala Asn Gly Glu
 1220 1225 1230
 Thr Val Leu Arg Asp Ala Ser Gly Glu Lys Arg Ile Lys Gly Glu
 1235 1240 1245
 25 Lys Asp Gly Arg Met Leu Met Asn Val Gly Leu Asn Ala Glu Ile
 1250 1255 1260
 30 Arg Asp Asn Leu Arg Phe Gly Leu Glu Phe Glu Lys Ser Ala Phe
 1265 1270 1275
 35 Gly Lys Tyr Asn Val Asp Asn Ala Ile Asn Ala Asn Phe Arg Tyr
 1280 1285 1290
 40 Ser Phe
 1295
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 45 <212> PRT
 <213> Escherichia coli
 <400> 6
 Met Ile Asn Ile Pro Ser Pro Thr Ala Val Val Met Ala Leu Val
 50 Ala
 1 5 10 15

Ile Ser Thr Leu Pro Ser Pro Ser Arg Val Lys Leu Met Pro Tyr
 Pro
 5 20 25 30

Pro Arg Ala His Asn Thr Thr Gly Leu Leu Pro Val Arg Glu Ile
 Cys
 10 35 40 45

Phe Pro His His Gly Asp Asp Gly Arg Asn Ser Ile Glu Pro Ser
 Ile
 15 50 55 60

Ser Arg Ala Ala His Thr Asp Arg Leu Arg Phe Val Cys Met Thr
 Arg
 20 65 70 75 80

Thr Gly Ser Thr Thr Ser Arg Pro Phe Cys Pro Ile Pro Arg Ser
 Pro
 25 85 90 95

Ala Leu Asn Ala Ser Gly Gln Gln Asp Ser Gly Phe Trp Gly Val
 Ser
 30 100 105 110

Ser Ile Pro Gly Asp Ile Leu Met Phe Gln Leu His Val Leu Ile
 Val
 35 115 120 125

Phe Ile Cys Lys Ile Asn Leu Ser Asp Asn Asn Ile Ser Tyr
 130 135 140
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<210> 7
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 45 <213> Escherichia coli
 <400> 7

Met Tyr Ala Arg Glu Tyr Arg Ser Thr Arg Pro His Lys Ala Ile
 Phe
 50 1 5 10 15

	Phe	His	Leu	Ser	Cys	Leu	Thr	Leu	Ile	Cys	Ser	Ala	Gln	Val	Tyr	
	Ala															
5				20					25					30		
	Lys	Pro	Asp	Met	Arg	Pro	Leu	Gly	Pro	Asn	Ile	Ala	Asp	Lys	Gly	
	Ser															
10			35					40					45			
	Val	Phe	Tyr	His	Phe	Ser	Ala	Thr	Ser	Phe	Asp	Ser	Val	Asp	Gly	
	Thr															
15		50					55					60				
	Arg	His	Tyr	Arg	Val	Trp	Thr	Ala	Val	Pro	Asn	Thr	Thr	Ala	Pro	
	Ala															
20	65					70					75				80	
	Ser	Gly	Tyr	Pro	Ile	Leu	Tyr	Met	Leu	Asp	Gly	Asn	Ala	Val	Met	
	Asp															
25					85					90					95	
	Arg	Leu	Asp	Asp	Glu	Leu	Leu	Lys	Gln	Leu	Ser	Glu	Lys	Thr	Pro	
	Pro															
30				100					105					110		
	Val	Ile	Val	Ala	Val	Gly	Tyr	Gln	Thr	Asn	Leu	Pro	Phe	Asp	Leu	
	Asn															
35			115					120					125			
	Ser	Arg	Ala	Tyr	Asp	Tyr	Thr	Pro	Ala	Ala	Glu	Ser	Arg	Lys	Thr	
	Asp															
40		130					135					140				
	Leu	His	Ser	Gly	Arg	Phe	Ser	Arg	Lys	Ser	Gly	Gly	Ser	Asn	Asn	
	Phe															
45	145					150					155					
	160															
	Arg	Gln	Leu	Leu	Glu	Thr	Arg	Ile	Ala	Pro	Lys	Val	Glu	Gln	Gly	
	Leu															
50					165					170					175	

Asn Ile Asp Arg Gln Arg Arg Gly Leu Trp Gly His Ser Tyr Gly
Gly
180 185 190
5

Leu Phe Val Leu Asp Ser Trp Leu Ser Ser Ser Tyr Phe Arg Ser
Tyr
195 200 205
10

Tyr Ser Ala Ser Pro Ser Leu Gly Arg Gly Tyr Asp Ala Leu Leu
Ser
210 215 220
15

Arg Val Thr Ala Val Glu Pro Leu Gln Phe Cys Thr Lys His Leu
Ala
225 230 235
20 240

Ile Met Glu Gly Ser Ala Thr Gln Gly Asp Asn Arg Glu Thr His
Ala
245 250 255
25

Val Gly Val Leu Ser Lys Ile His Thr Thr Leu Thr Ile Leu Lys
Asp
260 265 270
30

Lys Gly Val Asn Ala Val Phe Trp Asp Phe Pro Asn Leu Gly His
Gly
275 280 285
35

Pro Met Phe Asn Ala Ser Phe Arg Gln Ala Leu Leu Asp Ile Ser
Gly
290 295 300
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Glu Asn Ala Asn Tyr Thr Ala Gly Cys His Glu Leu Ser His
305 310 315
45

<210> 8
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<212> PRT
50 <213> Escherichia coli
<400> 8

Met Arg Ile Asn Lys Ile Leu Trp Ser Leu Thr Val Leu Leu Val
 Gly
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 5
 Leu Asn Ser Gln Val Ser Val Ala Lys Tyr Ser Asp Asp Asp Asn
 Asp
 20 25 30
 10
 Glu Thr Leu Val Val Glu Ala Thr Ala Glu Gln Val Leu Lys Gln
 Gln
 35 40 45
 15
 Pro Gly Val Ser Val Ile Thr Ser Glu Asp Ile Lys Lys Thr Pro
 Pro
 50 55 60
 20
 Val Asn Asp Leu Ser Asp Ile Ile Arg Lys Met Pro Gly Val Asn
 Leu
 65 70 75 80
 25
 Thr Gly Asn Ser Ala Ser Gly Thr Arg Gly Asn Asn Arg Gln Ile
 Asp
 85 90 95
 30
 Ile Arg Gly Met Gly Pro Glu Asn Thr Leu Ile Leu Ile Asp Gly
 Val
 100 105 110
 35
 Pro Val Thr Ser Arg Asn Ser Val Arg Tyr Ser Trp Arg Gly Glu
 Arg
 115 120 125
 40
 Asp Thr Arg Gly Asp Thr Asn Trp Val Pro Pro Glu Gln Val Glu
 Arg
 130 135 140
 45
 Ile Glu Val Ile Arg Gly Pro Ala Ala Ala Arg Tyr Gly Ser Gly
 Ala
 145 150 155
 50 160

	Ala Gly Gly Val Val Asn Ile Ile Thr Lys Arg Pro Thr Asn Asp		
	Trp		
5		165	170 175
	His Gly Ser Leu Ser Leu Tyr Thr Asn Gln Pro Glu Ser Ser Glu		
	Glu		
10		180	185 190
	Gly Ala Thr Arg Arg Ala Asn Phe Ser Leu Ser Gly Pro Leu Ala		
	Gly		
15		195	200 205
	Asp Ala Leu Thr Thr Arg Leu Tyr Gly Asn Leu Asn Lys Thr Asp		
	Ala		
20		210	215 220
	Asp Ser Trp Asp Ile Asn Ser Pro Val Gly Thr Lys Asn Ala Ala		
	Gly		
25		225	230 235
		240	
	His Glu Gly Val Arg Asn Lys Asp Ile Asn Gly Val Val Ser Trp		
	Lys		
30		245	250 255
	Leu Asn Pro Gln Gln Ile Leu Asp Phe Glu Val Gly Tyr Ser Arg		
	Gln		
35		260	265 270
	Gly Asn Ile Tyr Ala Gly Asp Thr Gln Asn Ser Ser Ser Ser Ala		
	Val		
40		275	280 285
	Thr Glu Ser Leu Ala Lys Ser Gly Lys Glu Thr Asn Arg Leu Tyr		
	Arg		
45		290	295 300
	Gln Asn Tyr Gly Ile Thr His Asn Gly Ile Trp Asp Trp Gly Gln		
	Ser		
50		305	310 315
		320	

5	Arg Phe Gly Val Tyr Tyr Glu Lys Thr Asn Asn Thr Arg Met Asn Glu	325	330	335
10	Gly Leu Ser Gly Gly Gly Glu Gly Arg Ile Leu Ala Gly Glu Lys Phe	340	345	350
15	Thr Thr Asn Arg Leu Ser Ser Trp Arg Thr Ser Gly Glu Leu Asn Ile	355	360	365
20	Pro Leu Asn Val Met Val Asp Gln Thr Leu Thr Val Gly Ala Glu Trp	370	375	380
25	Asn Arg Asp Lys Leu Asp Asp Pro Ser Ser Thr Ser Leu Thr Val Asn	385	390	395
	400			
30	Asp Arg Asp Ile Ser Gly Ile Ser Gly Ser Ala Ala Asp Arg Ser Ser	405	410	415
35	Lys Asn His Ser Gln Ile Ser Ala Leu Tyr Ile Glu Asp Asn Ile Glu	420	425	430
40	Pro Val Pro Gly Thr Asn Ile Ile Pro Gly Leu Arg Phe Asp Tyr Leu	435	440	445
45	Ser Asp Ser Gly Gly Asn Phe Ser Pro Ser Leu Asn Leu Ser Gln Glu	450	455	460
50	Leu Gly Asp Tyr Phe Lys Val Lys Ala Gly Val Ala Arg Thr Phe Lys			

465		470		475
480				
5	Ala Pro Asn Leu Tyr Gln Ser Ser Glu Gly Tyr Leu Leu Tyr Ser Lys	485	490	495
10	Gly Asn Gly Cys Pro Lys Asp Ile Thr Ser Gly Gly Cys Tyr Leu Ile	500	505	510
15	Gly Asn Lys Asp Leu Asp Pro Glu Ile Ser Val Asn Lys Glu Ile Gly	515	520	525
20	Leu Glu Phe Thr Trp Glu Asp Tyr His Ala Ser Val Thr Tyr Phe Arg	530	535	540
25	Asn Asp Tyr Gln Asn Lys Ile Val Ala Gly Asp Asn Val Ile Gly Gln	545	550	555
	560			
30	Thr Ala Ser Gly Ala Tyr Ile Leu Lys Trp Gln Asn Gly Gly Lys Ala	565	570	575
35	Leu Val Asp Gly Ile Glu Ala Ser Met Ser Phe Pro Leu Val Lys Glu	580	585	590
40	Arg Leu Asn Trp Asn Thr Asn Ala Thr Trp Met Ile Thr Ser Glu Gln	595	600	605
45	Lys Asp Thr Gly Asn Pro Leu Ser Val Ile Pro Lys Tyr Thr Ile Asn	610	615	620
50				

25/370

Asn Ser Leu Asn Trp Thr Ile Thr Gln Ala Phe Ser Ala Ser Phe
 Asn
 625 630 635
 640
 5

Trp Thr Leu Tyr Gly Arg Gln Lys Pro Arg Thr His Ala Glu Thr
 Arg
 645 650 655
 10

Ser Glu Asp Thr Gly Gly Leu Ser Gly Lys Glu Leu Gly Ala Tyr
 Ser
 660 665 670
 15

Leu Val Gly Thr Asn Phe Asn Tyr Asp Ile Asn Lys Asn Leu Arg
 Leu
 675 680 685
 20

Asn Val Gly Val Ser Asn Ile Leu Asn Lys Gln Ile Phe Arg Ser
 Ser
 690 695 700
 25

Glu Gly Ala Asn Thr Tyr Asn Glu Pro Gly Arg Ala Tyr Tyr Ala
 Gly
 705 710 715
 30 720

Val Thr Ala Ser Phe
 725
 35

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Met Gly Asn Gln Trp Gln Gln Lys Tyr Leu Leu Glu Tyr Asn Glu
 Leu
 45 1 5 10 15

Val Ser Asn Phe Pro Ser Pro Glu Arg Val Val Ser Asp Tyr Ile
 Lys
 50 20 25 30

	Asn	Cys	Phe	Lys	Thr	Asp	Leu	Pro	Trp	Phe	Ser	Arg	Ile	Asp	Pro
	Asp														
5			35					40						45	
	Asn	Ala	Tyr	Phe	Ile	Cys	Phe	Ser	Gln	Asn	Arg	Ser	Asn	Ser	Arg
	Ser														
10		50					55					60			
	Tyr	Thr	Gly	Trp	Asp	His	Leu	Gly	Lys	Tyr	Lys	Thr	Glu	Val	Leu
	Thr														
15	65					70					75				80
	Leu	Thr	Gln	Ala	Ala	Leu	Ile	Asn	Ile	Gly	Tyr	Arg	Phe	Asp	Val
	Phe														
20					85					90					95
	Asp	Asp	Ala	Asn	Ser	Ser	Thr	Gly	Ile	Tyr	Lys	Thr	Lys	Ser	Ala
	Asp														
25				100					105					110	
	Val	Phe	Asn	Glu	Glu	Asn	Glu	Glu	Lys	Met	Leu	Pro	Ser	Glu	Tyr
	Leu														
30			115					120					125		
	His	Phe	Leu	Gln	Lys	Cys	Asp	Phe	Ala	Gly	Val	Tyr	Gly	Lys	Thr
	Leu														
35		130					135					140			
	Ser	Asp	Tyr	Trp	Ser	Lys	Tyr	Tyr	Asp	Lys	Phe	Lys	Leu	Leu	Leu
	Lys														
40	145					150					155				
	160														
	Asn	Tyr	Tyr	Ile	Ser	Ser	Ala	Leu	Tyr	Leu	Tyr	Lys	Asn	Gly	Glu
	Leu														
45					165					170					175
	Asp	Glu	Arg	Glu	Tyr	Asn	Phe	Ser	Met	Asn	Ala	Leu	Asn	Arg	Ser
	Asp														
50				180						185				190	

	Asn	Ile	Ser	Leu	Leu	Phe	Phe	Asp	Ile	Tyr	Gly	Tyr	Tyr	Ala	Ser
	Asp														
5				195				200					205		
	Ile	Phe	Val	Ala	Lys	Asn	Asn	Asp	Lys	Val	Met	Leu	Phe	Ile	Pro
	Gly														
10				210				215					220		
	Ala	Lys	Lys	Pro	Phe	Leu	Phe	Lys	Lys	Asn	Ile	Ala	Asp	Leu	Arg
	Leu														
15	225					230						235			
	240														
	Thr	Leu	Lys	Glu	Leu	Ile	Lys	Asp	Ser	Asp	Asn	Lys	Gln	Leu	Leu
	Ser														
20					245					250					255
	Gln	His	Phe	Ser	Leu	Tyr	Ser	Arg	Gln	Asp	Gly	Val	Ser	Tyr	Ala
	Gly														
25				260					265					270	
	Val	Asn	Ser	Val	Leu	His	Ala	Ile	Glu	Asn	Asp	Gly	Asn	Phe	Asn
	Glu														
30			275					280					285		
	Ser	Tyr	Phe	Leu	Tyr	Ser	Asn	Lys	Thr	Leu	Ser	Asn	Lys	Asp	Val
	Phe														
35		290					295					300			
	Asp	Ala	Ile	Ala	Ile	Ser	Val	Lys	Lys	Arg	Ser	Phe	Ser	Asp	Gly
	Asp														
40	305					310					315				
	320														
	Ile	Val	Ile	Lys	Ser	Asn	Ser	Glu	Ala	Gln	Arg	Asp	Tyr	Ala	Leu
	Thr														
45					325					330					335
	Ile	Leu	Gln	Thr	Ile	Leu	Ser	Met	Thr	Pro	Ile	Phe	Asp	Ile	Val
	Val														
50				340					345					350	

5	Pro Glu Val Ser Val Pro Leu Gly Leu Gly Ile Ile Thr Ser Ser Met	355	360	365
10	Gly Ile Ser Phe Asp Gln Leu Ile Asn Gly Asp Thr Tyr Glu Glu Arg	370	375	380
15	Arg Ser Ala Ile Pro Gly Leu Ala Thr Asn Ala Val Leu Leu Gly Leu	385 400	390	395
20	Ser Phe Ala Ile Pro Leu Leu Ile Ser Lys Ala Gly Ile Asn Gln Glu	405	410	415
25	Val Leu Ser Ser Val Ile Asn Asn Glu Gly Arg Thr Leu Asn Glu Thr	420	425	430
30	Asn Ile Asp Ile Phe Leu Lys Glu Tyr Gly Ile Ala Glu Asp Ser Ile	435	440	445
35	Ser Ser Thr Asn Leu Leu Asp Val Lys Leu Lys Ser Ser Gly Gln His	450	455	460
40	Val Asn Ile Val Lys Leu Ser Asp Glu Asp Asn Gln Ile Val Ala Val	465 480	470	475
45	Lys Gly Ser Ser Leu Ser Gly Ile Tyr Tyr Glu Val Asp Ile Glu Thr	485	490	495
50	Gly Tyr Glu Ile Leu Ser Arg Arg Ile Tyr Arg Thr Glu Tyr Asn Asn			

		500		505		510
5	Glu Ile Leu Trp Thr Arg Gly Gly Gly Leu Lys Gly Gly Gln Pro Phe	515	520	525		
10	Asp Phe Glu Ser Leu Asn Ile Pro Val Phe Phe Lys Asp Glu Pro Tyr	530	535	540		
15	Ser Ala Val Thr Gly Ser Pro Leu Ser Phe Ile Asn Asp Asp Ser Ser 545 560	550	555			
20	Leu Leu Tyr Pro Asp Thr Asn Pro Lys Leu Pro Gln Pro Thr Ser Glu	565	570	575		
25	Met Asp Ile Val Asn Tyr Val Lys Gly Ser Gly Ser Phe Gly Asp Arg	580	585	590		
30	Phe Val Thr Leu Met Arg Gly Ala Thr Glu Glu Glu Ala Trp Asn Ile	595	600	605		
35	Ala Ser Tyr His Thr Ala Gly Gly Ser Thr Glu Glu Leu His Glu Ile	610	615	620		
40	Leu Leu Gly Gln Gly Pro Gln Ser Ser Leu Gly Phe Thr Glu Tyr Thr 625 640	630	635			
45	Ser Asn Val Asn Ser Ala Asp Ala Ala Ser Arg Arg His Phe Leu Val	645	650	655		
50						

	Val	Ile	Lys	Val	His	Val	Lys	Tyr	Ile	Thr	Asn	Asn	Asn	Val	Ser
	Tyr														
				660					665					670	
5	Val	Asn	His	Trp	Ala	Ile	Pro	Asp	Glu	Ala	Pro	Val	Glu	Val	Leu
	Ala														
			675					680					685		
10	Val	Val	Asp	Arg	Arg	Phe	Asn	Phe	Pro	Glu	Pro	Ser	Thr	Pro	Pro
	Asp														
		690					695					700			
15	Ile	Ser	Thr	Ile	Arg	Lys	Leu	Leu	Ser	Leu	Arg	Tyr	Phe	Lys	Glu
	Ser														
	705					710					715				
	720														
20	Ile	Glu	Ser	Thr	Ser	Lys	Ser	Asn	Phe	Gln	Lys	Leu	Ser	Arg	Gly
	Asn														
					725					730				735	
25	Ile	Asp	Val	Leu	Lys	Gly	Arg	Gly	Ser	Ile	Ser	Ser	Thr	Arg	Gln
	Arg														
			740					745					750		
30	Ala	Ile	Tyr	Pro	Tyr	Phe	Glu	Ala	Ala	Asn	Ala	Asp	Glu	Gln	Gln
	Pro														
			755					760					765		
35	Leu	Phe	Phe	Tyr	Ile	Lys	Lys	Asp	Arg	Phe	Asp	Asn	His	Gly	Tyr
	Asp														
		770					775					780			
40	Gln	Tyr	Phe	Tyr	Asp	Asn	Thr	Val	Gly	Leu	Asn	Gly	Ile	Pro	Thr
	Leu														
	785					790					795				
45	800														
	Asn	Thr	Tyr	Thr	Gly	Glu	Ile	Pro	Ser	Asp	Ser	Ser	Ser	Leu	Gly
	Ser														
50					805					810				815	

	Thr	Tyr	Trp	Lys	Lys	Tyr	Asn	Leu	Thr	Asn	Glu	Thr	Ser	Ile	Ile
	Arg														
				820					825					830	
5															
	Val	Ser	Asn	Ser	Ala	Arg	Gly	Ala	Asn	Gly	Ile	Lys	Ile	Ala	Leu
	Glu														
			835					840					845		
10															
	Glu	Val	Gln	Glu	Gly	Lys	Pro	Val	Ile	Ile	Thr	Ser	Gly	Asn	Leu
	Ser														
		850					855					860			
15															
	Gly	Cys	Thr	Thr	Ile	Val	Ala	Arg	Lys	Glu	Gly	Tyr	Ile	Tyr	Lys
	Val														
	865					870					875				
20	880														
	His	Thr	Gly	Thr	Thr	Lys	Ser	Leu	Ala	Gly	Phe	Thr	Ser	Thr	Thr
	Gly														
25				885						890				895	
	Val	Lys	Lys	Ala	Val	Glu	Val	Leu	Glu	Leu	Leu	Thr	Lys	Glu	Pro
	Ile														
30				900					905					910	
	Pro	Arg	Val	Glu	Gly	Ile	Met	Ser	Asn	Asp	Phe	Leu	Val	Asp	Tyr
	Leu														
35			915					920					925		
	Ser	Glu	Asn	Phe	Glu	Asp	Ser	Leu	Ile	Thr	Tyr	Ser	Ser	Ser	Glu
	Lys														
40		930					935					940			
	Lys	Pro	Asp	Ser	Gln	Ile	Thr	Ile	Ile	Arg	Asp	Asn	Val	Ser	Val
	Phe														
45	945					950					955				
	960														
	Pro	Tyr	Phe	Leu	Asp	Asn	Ile	Pro	Glu	His	Gly	Phe	Gly	Thr	Ser
50	Ala														
				965					970					975	

Thr Val Leu Val Arg Val Asp Gly Asn Val Val Val Arg Ser Leu
 Ser
 5 980 985 990

Glu Ser Tyr Ser Leu Asn Ala Asp Ala Ser Glu Ile Ser Val Leu
 Lys
 10 995 1000 1005

Val Phe Ser Lys Lys Phe
 1010
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Met Val Asp Met Ile Asn Glu Ser Ala Arg Gln Thr Pro Val Ile
 Ala
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Gln Thr Asp Val Leu Val Ile Gly Gly Gly Pro Ala Gly Leu Ser
 Ala
 30 20 25 30

Ala Ile Ala Ala Gly Arg Leu Gly Ala Arg Thr Met Ile Val Glu
 Arg
 35 35 40 45

Tyr Gly Ser Leu Gly Gly Val Leu Thr Gln Val Gly Val Glu Ser
 Phe
 40 50 55 60

Ala Trp Tyr Arg His Pro Gly Thr Glu Asp Cys Glu Gly Ile Cys
 Arg
 45 65 70 75 80

Glu Tyr Glu Gly Arg Ala Arg Ala Leu Gly Phe Thr Arg Pro Glu
 Pro
 50 85 90 95

	Gln Ser Ile Ser Glu Val Ile Asp Thr Glu Gly Phe Lys Val Val	
	Ala	
5	100	105 110
	Asp Gln Met Ile Thr Glu Ser Gly Val Glu Pro Leu Tyr His Ser	
	Trp	
10	115	120 125
	Val Val Asp Val Ile Lys Asp Gly Asp Thr Leu Cys Gly Val Ile	
	Val	
15	130	135 140
	Glu Asn Lys Ser Gly Arg Gly Ala Ile Leu Ala Lys Arg Ile Val	
	Asp	
20	145 150	155
	160	
	Cys Thr Gly Asp Ala Asp Ile Ala Ala Arg Ala Gly Ala Pro Trp	
	Thr	
25	165	170 175
	Lys Arg Ser Lys Asp Gln Leu Met Gly Val Thr Val Met Phe Ser	
	Cys	
30	180	185 190
	Ala Gly Val Asp Val Ala Arg Phe Asn Arg Phe Val Ala Glu Glu	
	Leu	
35	195	200 205
	Lys Pro Thr Tyr Ala Asp Trp Gly Lys Asn Trp Thr Ile Gln Thr	
	Thr	
40	210	215 220
	Gly Lys Glu Asp Pro Met Phe Ser Pro Tyr Met Glu Asp Ile Phe	
	Thr	
45	225 230	235
	240	
	Arg Ala Gln Gln Asp Gly Val Ile Pro Gly Asp Ala Gln Ala Ile	
	Ala	
50	245	250 255

5	Gly Thr Trp Ser Thr Phe Ser Glu Ser Gly Glu Ala Phe Gln Met Asn	260	265	270
10	Met Val Tyr Ala Phe Gly Phe Asp Cys Thr Asp Val Phe Asp Leu Thr	275	280	285
15	Lys Ala Glu Ile Ala Gly Arg Gln Gln Ala Leu Trp Ala Ile Asp Ala	290	295	300
20	Leu Arg His Tyr Val Pro Gly Phe Glu Asn Val Arg Leu Arg Asn Phe	305	310	315
	320			
25	Gly Ala Thr Leu Gly Thr Arg Glu Ser Arg Leu Ile Glu Gly Glu Ile	325	330	335
30	Arg Ile Ala Asp Asp Tyr Val Leu Asn Gln Gly Arg Cys Ser Asp Ser	340	345	350
35	Val Gly Ile Phe Pro Glu Phe Ile Asp Gly Ser Gly Tyr Leu Ile Leu	355	360	365
40	Pro Thr Thr Gly Arg Phe Phe Gln Ile Pro Tyr Gly Cys Leu Val Pro	370	375	380
45	Gln Lys Val Glu Asn Leu Leu Val Ala Gly Arg Cys Ile Ser Ala Gly	385	390	395
	400			
50	Val Val Ala His Thr Ser Met Arg Asn Met Met Cys Cys Ala Val Thr			

	405	410	415
5	Gly Glu Ala Ala Gly Thr Ala Ala Val Val Ser Leu Gln Gln Asn Cys	420	425 430
10	Thr Val Arg Gln Val Ala Ile Pro Asp Leu Gln Asn Thr Leu Gln Gln	435	440 445
15	Gln Gly Val Arg Leu Ala	450	
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25	Met Ser Ala Lys Arg Arg Leu Leu Ile Ala Cys Thr Leu Ile Thr Ala	1	5 10 15
30	Ile Tyr His Phe Pro Ala Tyr Ser Ser Leu Glu Tyr Lys Gly Thr Phe	20	25 30
35	Gly Ser Ile Asn Ala Gly Tyr Ala Asp Trp Asn Ser Gly Phe Val Asn	35	40 45
40	Thr His Arg Gly Glu Val Trp Lys Val Thr Ala Asp Phe Gly Val Asn	50	55 60
45	Phe Lys Glu Ala Glu Phe Tyr Ser Phe Tyr Glu Ser Asn Val Leu Asn	65	70 75 80
50	His Ala Val Ala Gly Arg Asn His Thr Val Ser Ala Met Thr His Val	85	90 95

5	Arg Gln	Leu	Phe	Asp	Ser	Asp	Met	Thr	Phe	Phe	Gly	Lys	Ile	Tyr	Gly	
				100					105					110		
10	Trp Gly	Asp	Asn	Ser	Trp	Gly	Asp	Asp	Leu	Asp	Met	Phe	Tyr	Gly	Phe	
			115					120					125			
15	Tyr Gly	Leu	Gly	Trp	Asn	Gly	Glu	Trp	Gly	Phe	Phe	Lys	Pro	Tyr	Ile	
		130					135					140				
20	Leu Thr 145 160	His	Asn	Gln	Ser	Gly	Asp	Tyr	Val	Ser	Ala	Lys	Tyr	Gly	Gln	
						150					155					
25	Asn Phe	Gly	Trp	Asn	Gly	Tyr	Val	Val	Gly	Trp	Thr	Ala	Val	Leu	Pro	
					165					170					175	
30	Thr Glu	Leu	Phe	Asp	Glu	Lys	Phe	Val	Leu	Ser	Asn	Trp	Asn	Glu	Ile	
				180					185					190		
35	Leu Gly	Asp	Arg	Asn	Asp	Ala	Tyr	Thr	Glu	Gln	Gln	Phe	Gly	Arg	Asn	
			195					200					205			
40	Leu Lys	Asn	Gly	Gly	Leu	Thr	Ile	Ala	Trp	Lys	Phe	Tyr	Pro	Arg	Trp	
		210					215					220				
45	Ala Gly 225 240	Ser	Val	Thr	Trp	Arg	Tyr	Phe	Asp	Asn	Lys	Leu	Gly	Tyr	Asp	
						230					235					
50	Phe	Gly	Asp	Gln	Met	Ile	Tyr	Met	Leu	Gly	Tyr	Asp	Phe			
				245						250						

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10 Met Ala Ser Leu Ile Gly Leu Ala Val Cys Thr Gly Asn Ala Phe
 Ser
 1 5 10 15

15 Pro Ala Leu Ala Ala Glu Ala Lys Gln Pro Asn Leu Val Ile Ile
 Met
 20 25 30

20 Ala Asp Asp Leu Gly Tyr Gly Asp Leu Ala Thr Tyr Gly His Gln
 Ile
 35 40 45

25 Val Lys Thr Pro Asn Ile Asp Arg Leu Ala Gln Glu Gly Val Lys
 Phe
 50 55 60

30 Thr Asp Tyr Tyr Ala Pro Ala Pro Leu Ser Ser Pro Ser Arg Ala
 Gly
 65 70 75 80

35 Leu Leu Thr Gly Arg Met Pro Phe Arg Thr Gly Ile Arg Ser Trp
 Ile
 85 90 95

40 Pro Ser Gly Lys Asp Val Ala Leu Gly Arg Asn Glu Leu Thr Ile
 Ala
 100 105 110

45 Asn Leu Leu Lys Ala Gln Gly Tyr Asp Thr Ala Met Met Gly Lys
 Leu
 115 120 125

50 His Leu Asn Ala Gly Gly Asp Arg Thr Asp Gln Pro Gln Ala Gln
 Asp
 130 135 140

	Met Gly Phe Asp Tyr Ser Leu Ala Asn Thr Ala Gly Phe Val Thr	
5	Asp 145 160	150 155
10	Ala Thr Leu Asp Asn Ala Lys Glu Arg Pro Arg Tyr Gly Met Val Tyr	165 170 175
15	Pro Thr Gly Trp Leu Arg Asn Gly Gln Pro Thr Pro Arg Ala Asp Lys	180 185 190
20	Met Ser Gly Glu Tyr Val Ser Ser Glu Val Val Asn Trp Leu Asp Asn	195 200 205
25	Lys Lys Asp Ser Lys Pro Phe Phe Leu Tyr Val Ala Phe Thr Glu Val	210 215 220
30	His Ser Pro Leu Ala Ser Pro Lys Lys Tyr Leu Asp Met Tyr Ser Gln 225 240	230 235
35	Tyr Met Ser Ala Tyr Gln Lys Gln His Pro Asp Leu Phe Tyr Gly Asp	245 250 255
40	Trp Ala Asp Lys Pro Trp Arg Gly Val Gly Glu Tyr Tyr Ala Asn Ile	260 265 270
45	Ser Tyr Leu Asp Ala Gln Val Gly Lys Val Leu Asp Lys Ile Lys Ala	275 280 285
50	Met Gly Glu Glu Asp Asn Thr Ile Val Ile Phe Thr Ser Asp Asn Gly	

	290		295		300
5	Pro Val Thr Arg Glu Ala Arg Lys Val Tyr Glu Leu Asn Leu Ala Gly 305 320		310		315
10	Glu Thr Asp Gly Leu Arg Gly Arg Lys Asp Asn Leu Trp Glu Gly Gly		325		330 335
15	Ile Arg Val Pro Ala Ile Ile Lys Tyr Gly Lys His Leu Pro Gln Gly		340		345 350
20	Met Val Ser Asp Thr Pro Val Tyr Gly Leu Asp Trp Met Pro Thr Leu		355		360 365
25	Ala Lys Met Met Asn Phe Lys Leu Pro Thr Asp Arg Thr Phe Asp Gly		370		375 380
30	Glu Ser Leu Val Pro Val Leu Glu Gln Lys Ala Leu Lys Arg Glu Lys 385 400		390		395
35	Pro Leu Ile Phe Gly Ile Asp Met Pro Phe Gln Asp Asp Pro Thr Asp		405		410 415
40	Glu Trp Ala Ile Arg Asp Gly Asp Trp Lys Met Ile Ile Asp Arg Asn		420		425 430
45	Asn Lys Pro Lys Tyr Leu Tyr Asn Leu Lys Ser Asp Arg Tyr Glu Thr		435		440 445
50					

Leu Asn Leu Ile Gly Lys Lys Pro Asp Ile Glu Lys Gln Met Tyr
 Gly
 450 455 460

5

Lys Phe Leu Lys Tyr Lys Thr Asp Ile Asp Asn Asp Ser Leu Met
 Lys
 465 470 475
 480

10

Ala Arg Gly Asp Lys Pro Glu Ala Val Thr Trp Gly
 485 490

15

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 <213> Escherichia coli
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Leu Ile Ser Leu Ser Phe Ile Pro Val Met Ser Ala Leu Pro Gly
 Pro
 1 5 10 15

25

Ile Ala Lys Gly Phe Arg Asn Glu Arg Gly Phe Val Thr Thr Thr
 Ile
 20 25 30

30

Cys Ala Met Gly Glu Leu Leu Ala Glu Phe Leu Ser Arg Asn Pro
 His
 35 40 45

35

Gln Lys Phe Thr Gln Pro Gly Glu Phe Ile Gly Pro Phe Pro Ser
 Gly
 50 55 60

40

Ala Pro Ala Ile Phe Ala Ala Gln Val Ala Lys Leu Ser His Arg
 Ala
 65 70 75 80

45

Ile Phe Phe Gly Cys Val Gly Asn Asp Asp Phe Ala Arg Leu Ile
 Ile
 85 90 95

50

	Glu	Arg	Leu	Arg	His	Glu	Gly	Val	Ile	Thr	Asp	Gly	Ile	His	Val
	Met														
				100					105					110	
5	Asn	Asn	Ala	Val	Thr	Gly	Thr	Ala	Phe	Val	Ser	Tyr	Gln	Asn	Pro
	Gln														
			115					120					125		
10	Gln	Arg	Asp	Phe	Val	Phe	Asn	Ile	Pro	Asn	Ser	Ala	Cys	Gly	Leu
	Phe														
		130						135					140		
15	Thr	Ala	Glu	His	Ile	Asp	Lys	Asp	Leu	Leu	Lys	Gln	Cys	Asn	His
	Leu														
	145					150					155				
	160														
20	His	Ile	Val	Gly	Ser	Ser	Leu	Phe	Ser	Phe	Arg	Met	Ile	Asp	Val
	Met														
				165						170				175	
25	Arg	Lys	Ala	Ile	Thr	Thr	Ile	Lys	Ser	Ala	Gly	Gly	Thr	Val	Ser
	Phe														
			180						185					190	
30	Asp	Pro	Asn	Ile	Arg	Lys	Glu	Met	Leu	Ser	Ile	Pro	Glu	Met	Ala
	Gln														
			195					200					205		
35	Ala	Leu	Asp	Tyr	Leu	Ile	Glu	Tyr	Thr	Asp	Ile	Phe	Ile	Pro	Ser
	Glu														
		210					215					220			
40	Ser	Glu	Leu	Pro	Phe	Phe	Ala	Arg	His	Lys	Asn	Leu	Ser	Glu	Glu
	Gln														
	225					230					235				
45	240														
	Ile	Val	Ser	Asp	Leu	Leu	His	Gly	Gly	Val	Lys	His	Val	Ala	Ile
	Lys														
50				245						250				255	

Arg Ala Gln Arg Gly Ala Ser Tyr Tyr Lys Leu Lys Asn Gly Thr
 Leu
 260 265 270
 5

His Ala Gln His Val Ala Gly His Asp Ile Glu Ile Ile Asp Pro
 Thr
 275 280 285
 10

Gly Ala Gly Asp Cys Phe Gly Ala Thr Phe Ile Thr Leu Phe Leu
 Ser
 290 295 300
 15

Gly Phe Pro Ala His Lys Ala Leu Gln Tyr Ala Asn Ala Ser Gly
 Ala
 305 310 315
 320
 20

Leu Ala Val Met Arg Gln Gly Pro Met Glu Gly Ile Ser Ser Leu
 Ala
 325 330 335
 25

Asp Ile Glu Asp Phe Leu Gln Gln His
 340 345
 30

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Met Tyr Met Pro Gly Lys Gln Met Leu Cys Cys Ile Leu Ile Ser
 Ile
 1 5 10 15
 40

Ile Ser Glu Gly Asp Met Lys Ile Phe Ile Ser Leu Phe Leu Phe
 Ile
 20 25 30
 45

Ile Ser Thr Asn Ser Phe Ala Asp Asp Ile Thr His Ala Gly Val
 Val
 35 40 45
 50

Arg Ile Glu Gly Leu Ile Thr Glu Lys Thr Cys Ile Ile Ser Asp
 Glu
 50 55 60
 5

Ser Lys Asn Phe Thr Val Asn Met Pro Asp Val Pro Ser Ser Ser
 Val
 65 70 75 80
 10

Arg Ser Ala Gly Asp Val Thr Glu Lys Val Tyr Phe Ser Ile Thr
 Leu
 85 90 95
 15

Thr Arg Cys Gly Ser Asp Val Gly Asn Ala Tyr Ile Lys Phe Thr
 Gly
 100 105 110
 20

Asn Thr Val Ser Glu Asp Ala Ser Leu Tyr Lys Leu Glu Asp Gly
 Ser
 115 120 125
 25

Val Glu Gly Leu Ala Leu Thr Ile Phe Asp Lys Asn Lys Gly Ser
 Ile
 130 135 140
 30

Ser Asn Asp Val Lys Ser Met Val Phe Ser Leu Thr Ser Ser Val
 Asp
 145 150 155
 35 160

Asn Ile Leu His Phe Phe Ala Ala Tyr Lys Ala Leu Lys Asn Asn
 Val
 165 170 175
 40

Gln Pro Gly Asp Ala Asn Ala Ser Val Ser Phe Ile Val Thr Tyr
 Asp
 180 185 190
 45

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 50 <212> PRT
 <213> Escherichia coli

5	Met Val 1	Ile	Lys	Phe	Arg	Leu	Tyr	Ile	Pro	Pro	Val	Ile	Leu	Gly	Phe	15
10	Ile Leu	Val	Pro	Leu	Leu	Val	Trp	Pro	Thr	Val	Ile	Ala	Leu	Ala	Val	20
15	Ile Leu	Phe	Thr	Leu	Thr	Phe	Leu	Ala	Glu	Ile	Ile	Phe	Ser	Phe	Pro	25
20	Leu Val	Val	Arg	Ile	Ser	Leu	Gln	Glu	Leu	Gln	Leu	Glu	Leu	Leu		30
25	Val Phe	Tyr	Ala	Leu	Phe	Phe	Ser	Val	Met	Gly	Gly	Ile	Gly	Trp	Gln	35
30	Ser Leu	Arg	Arg	Thr	Pro	Pro	Glu	Leu	Lys	Asn	Arg	Leu	His	Cys	Trp	40
35	Val Leu	Phe	Ser	Pro	Val	Tyr	Phe	Trp	Leu	Ile	Leu	Ser	Asn	Phe	Ile	45
40	Tyr Phe	Ile	Ser	Pro	Glu	Lys	Ser	Ala	Leu	Leu	Glu	Asn	Ile	Arg	Asn	50
45	Phe Pro	Leu	Thr	Phe	Val	Trp	Leu	Pro	Leu	Asn	Phe	Ser	Pro	Phe	Trp	55
50	Gln Phe	Pro	Trp	Thr	Asp	Phe	Val	Gly	Pro	Ile	Ser	Ala	Gln	Leu	Gly	60

Ala Leu Gly Tyr Tyr Cys Gln Trp Arg Ser Lys Asn Arg Ser His
 Arg
 5 165 170 175

Lys Lys Trp Gly Asp Trp Val Thr Cys Leu Ser Leu Ala Ile Leu
 Ala
 10 180 185 190

Leu Gly Pro Leu Phe Asn Tyr Leu Gln
 195 200
 15

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Met Lys Phe Asn Leu Ser Asn Leu Ser Ala Val Leu Leu Ala Ser
 Gly
 25 1 5 10 15

Met Leu Met Ser Thr Ala Val Thr Ala Ala Pro Gly Asp Ala Thr
 Gln
 30 20 25 30

Phe Gly Gly Ala Asp Thr Asp Trp Ser Thr Val Asp Tyr Pro Arg
 Leu
 35 35 40 45

Thr Asp Met Asp Asp Asn Val Asp Ser Met Gly Gly Lys Ile Arg
 Phe
 40 50 55 60

Thr Gly Arg Val Val Lys Ala Thr Cys Lys Val Ala Thr Asp Ser
 Lys
 45 65 70 75 80

Gln Ile Glu Val Val Leu Pro Val Val Pro Ser Asn Leu Phe Thr
 Gly
 50 85 90 95

Ile Asp Val Glu Ala Gln Gly Ala Ser Asn Gln Thr Asp Phe Asn
 Ile
 100 105 110
 5

Asn Leu Thr Glu Cys Ser Asn Thr Asp Asp Gln Lys Ile Glu Phe
 Arg
 115 120 125
 10

Phe Thr Gly Thr Ala Asp Ser Ala Asn Lys Thr Leu Ala Asn Glu
 Val
 130 135 140
 15

Glu Gly Ser Thr Asp Ala Asp Asn Ser Gly Asn Ala Gly Ala Thr
 Gly
 145 150 155
 20 160

Val Gly Ile Arg Ile Tyr Ser Lys Gly Thr Thr Asn Asn Gly Leu
 Ile
 165 170 175
 25

Asn Leu Asn Thr Thr Ala Ala Glu Gly Ser Ala Ser Thr Ala Ala
 Tyr
 180 185 190
 30

Thr Ile Pro Gly Asn Ala Thr Thr His Asp Phe Ser Ala Ala Phe
 Thr
 195 200 205
 35

Ala Gly Tyr Ala Gln Asn Gly Ser Thr Val Ala Pro Gly Val Val
 Lys
 210 215 220
 40

Ser Thr Ala Ser Phe Val Val Leu Tyr Glu
 225 230
 45

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 50 <213> Escherichia coli
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	<211> 864														
10	<212> PRT														
	<213> Escherichia coli														
	<400> 18														
	Met	Asn	Leu	Lys	Leu	Lys	Arg	Cys	Glu	Tyr	Trp	Met	Ala	Ala	Gln
15	Lys														
	1				5					10					15
	Gln	Met	Lys	Arg	Val	Val	Pro	Leu	Leu	Leu	Val	Ile	Met	Pro	Ala
20	Cys														
				20					25					30	
	Ser	Ile	Ala	Gly	Met	Arg	Phe	Asn	Pro	Ala	Phe	Leu	Ser	Gly	Asp
25	Thr														
			35					40					45		
	Glu	Ala	Val	Ala	Asp	Leu	Ser	Arg	Phe	Glu	Lys	Gly	Met	Thr	Tyr
30	Leu														
		50					55					60			
	Pro	Gly	Ser	Tyr	Glu	Val	Glu	Val	Trp	Val	Asn	Asp	Ser	Pro	Leu
35	Leu														
	65					70					75				80
	Ser	Arg	Thr	Val	Thr	Phe	Lys	Ala	Asp	Asp	Glu	Asn	Gln	Leu	Ile
40	Pro														
						85				90					95
	Cys	Leu	Ser	Leu	Ala	Asp	Leu	Leu	Ser	Leu	Gly	Ile	Asn	Lys	Asn
45	Ala														
					100				105					110	
	Leu	Pro	Glu	Gln	Ala	Leu	Ala	Ser	Ser	Glu	Asn	Ser	Cys	Leu	Asp
50	Leu														
					115				120					125	

5	Arg Ile Trp Phe Pro Asp Val His Tyr Met Pro Glu Leu Asp Ala Gln	130	135	140
10	Arg Leu Lys Leu Thr Phe Pro Gln Ala Ile Ile Lys Arg Asp Ala Arg	145	150	155
	160			
15	Gly Tyr Ile Pro Pro Glu Gln Trp Asp Asn Gly Ile Thr Ala Phe Leu	165	170	175
20	Leu Asn Tyr Asp Phe Ser Gly Asn Asn Asp Arg Gly Asp Tyr Ser Ser	180	185	190
25	Asn Asn Tyr Tyr Leu Asn Leu Arg Ala Gly Ile Asn Ile Gly Ala Trp	195	200	205
30	Arg Phe Arg Asp Tyr Ser Thr Trp Ser Arg Gly Ser Asn Ser Ala Gly	210	215	220
35	Lys Leu Glu His Ile Ser Ser Thr Leu Gln Arg Val Ile Ile Pro Phe	225	230	235
	240			
40	Arg Ser Glu Leu Thr Leu Gly Asp Thr Trp Ser Ser Ser Asp Val Phe	245	250	255
45	Asp Ser Val Ser Ile Arg Gly Ile Lys Leu Glu Ser Asp Glu Asn Met	260	265	270
50	Leu Pro Asp Ser Gln Ser Gly Phe Ala Pro Thr Val Arg Gly Ile Ala			

	275	280	285
5	Lys Ser Arg Ala Gln Val Thr Ile Lys Gln Asn Gly Tyr Val Ile Tyr 290	295	300
10	Gln Thr Tyr Met Pro Pro Gly Pro Phe Glu Ile Ser Asp Leu Asn Pro 305 320	310	315
15	Thr Ser Ser Ala Gly Asp Leu Glu Val Thr Ile Lys Glu Ser Asp Asn 325	330	335
20	Ser Glu Thr Val Tyr Thr Val Pro Tyr Ala Ala Val Pro Ile Leu Gln 340	345	350
25	Arg Glu Gly His Leu Lys Tyr Ser Thr Thr Val Gly Gln Tyr Arg Ser 355	360	365
30	Asn Ser Tyr Asn Gln Lys Ser Pro Tyr Val Phe Gln Gly Glu Leu Ile 370	375	380
35	Trp Gly Leu Pro Trp Asp Ile Thr Ala Tyr Gly Gly Ala Gln Phe Ser 385 400	390	395
40	Glu Asp Tyr Arg Ala Leu Ala Leu Gly Leu Gly Leu Asn Leu Gly Val 405	410	415
45	Phe Gly Ala Thr Ser Phe Asp Val Thr Gln Ala Asn Ser Ser Leu Val 420	425	430
50			

	Asp	Gly	Ser	Lys	His	Gln	Gly	Gln	Ser	Tyr	Arg	Phe	Leu	Tyr	Ser
	Lys														
				435				440					445		
5	Ser	Leu	Val	Gln	Thr	Gly	Thr	Ala	Phe	His	Ile	Ile	Gly	Tyr	Arg
	Tyr														
		450					455					460			
10	Ser	Thr	Gln	Gly	Phe	Tyr	Thr	Leu	Ser	Asp	Thr	Thr	Tyr	Gln	Gln
	Met														
	465						470				475				
	480														
15	Ser	Gly	Thr	Val	Val	Asp	Pro	Lys	Thr	Leu	Asp	Asp	Lys	Asp	Tyr
	Val														
					485					490					495
20	Tyr	Asn	Trp	Asn	Asp	Phe	Tyr	Asn	Leu	Arg	Tyr	Ser	Lys	Arg	Gly
	Lys														
				500					505					510	
25	Phe	Gln	Ala	Ser	Val	Ser	Gln	Pro	Phe	Gly	Asn	Tyr	Gly	Ser	Met
	Tyr														
			515					520					525		
30	Leu	Ser	Ala	Ser	Gln	Gln	Thr	Tyr	Trp	Asn	Thr	Asp	Lys	Lys	Asp
	Ser														
		530					535					540			
35	Leu	Tyr	Gln	Val	Gly	Tyr	Asn	Thr	Ser	Ile	Lys	Gly	Ile	Tyr	Leu
	Asn														
	545					550				555					
40	560														
	Val	Ala	Trp	Asn	Tyr	Ser	Lys	Ser	Pro	Gly	Thr	Asn	Ala	Asp	Lys
	Ile														
45					565					570					575
	Val	Ser	Leu	Asn	Val	Ser	Leu	Pro	Ile	Ser	Asn	Trp	Leu	Ser	Ser
	Thr														
50				580					585					590	

	Asn Asp Gly Arg Ser Ser Ser Asn Ala Met Thr Ala Thr Tyr Gly			
	Tyr	595	600	605
5				
	Ser Gln Asp Asn His Gly Gln Val Asn Gln Tyr Thr Gly Val Ser			
	Gly	610	615	620
10				
	Ser Leu Leu Glu Gln His Asn Leu Ser Tyr Asn Ile Gln His Gly			
	Phe			
	625	630	635	
15	640			
	Ala Asn Gln Asp Asn Ser Ser Ser Gly Ser Val Gly Val Asn Tyr			
	Arg			
20		645	650	655
	Gly Ala Tyr Gly Ser Leu Asn Ser Ala Tyr Ser Tyr Asp Asn Glu			
	Gly			
25		660	665	670
	Asn Gln Gln Ile Asn Tyr Gly Ile Ser Gly Ala Leu Val Val His			
	Glu			
30		675	680	685
	Asn Gly Leu Thr Leu Ser Gln Pro Leu Gly Glu Thr Asn Val Leu			
	Ile			
35		690	695	700
	Lys Ala Pro Gly Ala Asn Asn Val Asp Val Gln Arg Gly Thr Gly			
	Ile			
40		705	710	715
	720			
	Ser Thr Asp Trp Arg Gly Tyr Ala Val Val Pro Tyr Ala Thr Glu			
	Tyr			
45		725	730	735
	Arg Arg Asn Asn Ile Ser Leu Asp Pro Met Ser Met Asn Met His			
	Thr			
50		740	745	750

Glu Leu Asp Ile Thr Ser Thr Glu Val Ile Pro Gly Lys Gly Ala
 Leu
 5 755 760 765

Val Arg Ala Glu Phe Ala Ala His Ile Gly Ile Arg Gly Leu Phe
 Thr
 10 770 775 780

Val Arg Tyr Arg Asn Lys Ser Val Pro Phe Gly Ala Thr Ala Ser
 Ala
 15 785 790 795
 800

Gln Ile Lys Asn Ser Ser Gln Ile Thr Gly Ile Val Gly Asp Asn
 Gly
 20 805 810 815

Gln Leu Tyr Leu Ser Gly Leu Pro Leu Glu Gly Val Ile Asn Ile
 Gln
 25 820 825 830

Trp Gly Asp Gly Val Gln Gln Lys Cys Gln Ala Asn Tyr Lys Leu
 Pro
 30 835 840 845

Glu Thr Glu Leu Asp Asn Pro Val Ser Tyr Ala Thr Leu Glu Cys
 Arg
 35 850 855 860

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Met Gly Ala Ile Tyr Val Lys Arg Leu Ile Leu Ser Val Ala Leu
 Ile
 45 1 5 10 15

Ile Pro Ile Ala Ser Asn Ala Ser Asp Ala Leu Asn Gln Pro Ser
 Ser
 50 20 25 30

Ser Leu Asn Asp Gly Val Glu Thr Phe Phe Ile Ser Cys Phe Asp
Met
35 40 45

5 Pro Gln Glu Thr Thr Thr Asp Met Asp Ala Cys Gln Arg Val Gln
Leu
50 55 60

10 Ala Gln Val Ser Trp Val Lys Asn Lys Tyr Ser Val Ala Ala Leu
Asn
65 70 75 80

15 Arg Leu Lys Gln Asp Asn Lys Asp Asp Pro Gln Arg Leu Gln Glu
Leu
85 90 95

20 Thr Ala Ser Phe Asn Ala Glu Ser Glu Ala Trp Thr Glu Leu Ile
Glu
100 105 110

25 Lys Ala Ser Lys Ser Val Gln Val Asp Tyr Val Gly Gly Thr Ile
Ala
115 120 125

30 Gly Thr Ala Val Ala Ser Arg Gln Ile Gly Leu Leu Glu Leu Gln
Ser
130 135 140

35 His Asp Ile Trp Glu His Trp Leu Arg Ser Arg Gly Leu Asn Ser
Ser
145 150 155
160

40 Ser Phe Ala Arg Thr Lys Val Gln Ile
165

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	Tyr Gly Ile Leu Asp Pro Gly Gly Leu Ile Asn Val Val Thr Lys		
	Arg		
		165	170 175
5	Pro Glu Lys Thr Phe His Gly Ser Val Ser Ala Thr Ser Ser Ser		
	Phe		
		180	185 190
10	Gly Gly Gly Thr Gly Gln Leu Asp Ile Thr Gly Pro Ile Glu Gly		
	Thr		
		195	200 205
15	Gln Leu Ala Tyr Arg Leu Thr Gly Glu Val Gln Asp Glu Asp Tyr		
	Trp		
		210	215 220
20	Arg Asn Phe Gly Lys Glu Arg Ser Thr Phe Ile Ala Pro Ser Leu		
	Thr		
		225	230 235
		240	
25	Trp Phe Gly Asp Asn Ala Thr Val Thr Met Leu Tyr Ser His Arg		
	Asp		
		245	250 255
30	Tyr Lys Thr Pro Phe Asp Arg Gly Thr Ile Phe Asp Leu Thr Thr		
	Lys		
		260	265 270
35	Gln Pro Val Asn Val Asp Arg Lys Ile Arg Phe Asp Glu Pro Phe		
	Asn		
		275	280 285
40	Ile Thr Asp Gly Gln Ser Asp Leu Ala Gln Leu Asn Ala Glu Tyr		
	His		
		290	295 300
45	Leu Asn Ser Gln Trp Thr Ala Arg Phe Asp Tyr Ser Tyr Ser Gln		
	Asp		
		305	310 315
50	320		

	Lys Tyr Ser Asp Asn Gln Ala Arg Val Thr Ala Tyr Asp Ala Thr		
	Thr		
5		325	330 335
	Gly Thr Leu Thr Arg Arg Val Asp Ala Thr Gln Gly Ser Thr Gln		
	Arg		
10		340	345 350
	Met His Ala Thr Arg Ala Asp Leu Gln Gly Asn Val Asp Ile Ala		
	Gly		
15		355	360 365
	Phe Tyr Asn Glu Ile Leu Gly Gly Val Ser Tyr Glu Tyr Tyr Asp		
	Leu		
20		370	375 380
	Leu Arg Thr Asp Met Ile Arg Cys Lys Lys Ala Lys Asp Phe Asn		
	Ile		
25		385	390 395
	400		
	Tyr Asn Pro Val Tyr Gly Asn Thr Ser Lys Cys Thr Thr Val Ser		
	Ala		
30		405	410 415
	Ser Asp Ser Asp Gln Thr Ile Lys Gln Glu Asn Tyr Ser Ala Tyr		
	Ala		
35		420	425 430
	Gln Asp Ala Leu Tyr Leu Thr Asp Asn Trp Ile Ala Val Ala Gly		
	Ile		
40		435	440 445
	Arg Tyr Gln Tyr Tyr Thr Gln Tyr Ala Gly Lys Gly Arg Pro Phe		
	Asn		
45		450	455 460
	Val Asn Thr Asp Ser Arg Asp Glu Gln Trp Thr Pro Lys Leu Gly		
	Leu		
50		465	470 475
	480		

5	Val Gln	Tyr	Lys	Leu	Thr	Pro	Ser	Val	Ser	Leu	Phe	Ala	Asn	Tyr	Ser	
					485					490						495
10	Thr Pro	Phe	Met	Pro	Gln	Ser	Ser	Ile	Ala	Ser	Tyr	Ile	Gly	Asp	Leu	
				500					505						510	
15	Pro Phe	Glu	Ser	Ser	Asn	Ala	Tyr	Glu	Val	Gly	Ala	Lys	Phe	Glu	Leu	
			515					520						525		
20	Asp Asn	Gly	Ile	Thr	Ala	Asp	Ile	Ala	Leu	Phe	Asp	Ile	His	Lys	Arg	
		530					535					540				
25	Val Ala	Leu	Tyr	Thr	Glu	Ser	Ile	Gly	Asp	Glu	Thr	Ile	Ala	Lys	Thr	
	545					550					555					
	560															
30	Gly Leu	Arg	Val	Arg	Ser	Arg	Gly	Val	Glu	Val	Asp	Leu	Ala	Gly	Ala	
					565					570					575	
35	Thr Lys	Glu	Asn	Ile	Asn	Ile	Ile	Ala	Ser	Tyr	Gly	Tyr	Thr	Asp	Ala	
				580					585					590		
40	Val Pro	Leu	Glu	Asp	Pro	Asp	Tyr	Ala	Gly	Lys	Pro	Leu	Pro	Asn	Val	
			595					600					605			
45	Arg Pro	His	Thr	Gly	Ser	Leu	Phe	Leu	Thr	Tyr	Asp	Ile	His	Asn	Met	
		610				615					620					
50	Gly Arg	Asn	Asn	Thr	Leu	Thr	Phe	Gly	Gly	Gly	Gly	His	Gly	Val	Ser	

625
 640

630

635

5 Arg Ser Ala Thr Asn Gly Ala Asp Tyr Tyr Leu Pro Gly Tyr Phe
 Val
 645 650 655

10 Ala Asp Ala Phe Ala Ala Tyr Lys Met Lys Leu Gln Tyr Pro Val
 Thr
 660 665 670

15 Leu Gln Leu Asn Val Lys Asn Leu Phe Asp Lys Thr Tyr Tyr Thr
 Ser
 675 680 685

20 Ser Ile Ala Thr Asn Asn Leu Gly Asn Gln Ile Gly Asp Pro Arg
 Glu
 690 695 700

25 Val Gln Phe Thr Val Lys Met Glu Phe
 705 710

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 Met Lys Ile Ser Trp Asn Tyr Ile Phe Lys Asn Lys Trp Arg Phe
 His
 1 5 10 15

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 Ile Thr Ser Ile Ser Leu Phe Leu Ile Met Leu Ala Val Ser Ile
 Ala
 20 25 30

40
 Phe Leu His Leu Arg Phe Asn Thr Leu Ser Ser Thr Asp Lys Met
 Arg
 35 40 45

45
 Leu Glu Met Tyr Lys Ser Thr Leu Tyr Ser Thr Ile Glu Gln Phe
 Tyr
 50 55 60

50

Val Leu Pro Tyr Met Leu Ser Thr Asp His Ile Ile Arg Gln Ala
 Val
 65 70 75 80

5

Ile Thr Pro Asp Asp Met Thr Ser Ser Glu Leu Asn Gln Arg Ile
 Ala
 85 90 95

10

His Phe Asn Thr Gln Leu Lys Thr Ala Ala Ile Phe Ile Leu Asp
 Thr
 100 105 110

15

Gln Gly Lys Ala Ile Ala Ser Ser Asn Trp Gln Asp Pro Gly Ser
 Tyr
 115 120 125

20

Val Gly Gln Asn Tyr Ser Tyr Arg Pro Tyr Tyr Lys His Ala Met
 Ser
 130 135 140

25

Gly Leu Asn Gly Arg Phe Tyr Gly Ile Gly Ser Thr Thr Asn Thr
 Pro
 145 150 155
 160

30

Gly Phe Phe Leu Ser Thr Ser Ile Lys Asp Lys Gly Lys Ile Val
 Gly
 165 170 175

35

Val Val Val Val Lys Ile Ser Leu Asn Glu Ile Glu Lys Ala Trp
 Ala
 180 185 190

40

Glu Gly Pro Glu Asn Ile Ile Val Asn Asp Glu His Gly Ile Ile
 Phe
 195 200 205

45

Leu Ser Ser Lys Ser Pro Trp Arg Met Arg Thr Leu Gln Pro Leu
 Pro
 210 215 220

50

Val Gln Ala Lys Gln Lys Leu Gln Ser Thr Arg Gln Tyr Ser Leu
 Asp
 225 230 235
 240

5

Asn Leu Leu Pro Ala Asp Tyr Tyr Pro Cys Tyr Thr Val Ser Asn
 Phe
 245 250 255

10

Thr Phe Leu Lys Asp Lys Lys Glu Gln Leu Cys Leu Phe Pro Gln
 Tyr
 260 265 270

15

Tyr Thr Gln Gln Ile Ala Ile Pro Glu Phe Asn Trp Lys Met Thr
 Ile
 275 280 285

20

Met Val Pro Leu Asp Asn Leu Tyr Trp Ser Trp Ala Ile Ser Leu
 Val
 290 295 300

25

Ile Thr Leu Ile Ile Tyr Leu Leu Phe Leu Leu Phe Ile Lys Tyr
 Trp
 305 310 315
 320

30

Arg Met Arg Ser His Ala Gln Gln Leu Leu Thr Leu Ala Asn Glu
 Thr
 325 330 335

35

Leu Glu Lys Gln Val Lys Glu Arg Thr Ser Ala Leu Glu Leu Ile
 Asn
 340 345 350

40

Gln Lys Leu Ile Gln Glu Ile Lys Glu Arg Ser Gln Ala Glu Gln
 Val
 355 360 365

45

Leu Gln Ile Thr Arg Ser Glu Leu Ala Glu Ser Ser Lys Leu Ala
 Ala
 370 375 380

50

	Leu Gly Gln Met Ala Thr Glu Ile Ala His Glu Gln Asn Gln Pro		
	Leu		
	385	390	395
5	400		
	Ala Ala Ile His Ala Leu Thr Asp Asn Ala Arg Thr Met Leu Lys		
	Lys		
10		405	410 415
	Glu Met Tyr Pro Gln Val Glu Gln Asn Leu Lys His Ile Ile Ser		
	Val		
15		420	425 430
	Ile Glu Arg Met Thr Gln Leu Ile Ser Glu Leu Lys Ala Phe Ala		
	Ser		
20		435	440 445
	Arg His Arg Val Pro Lys Gly Ser Ala Asp Val Ile Lys Val Met		
	Tyr		
25		450	455 460
	Ser Ala Val Ala Leu Leu Asn His Ser Met Glu Lys Asn Asn Ile		
	Glu		
30		465	470 475
	480		
	Arg Arg Ile Lys Ala Pro Ser Met Pro Leu Phe Val Asn Cys Asp		
	Glu		
35		485	490 495
	Leu Gly Leu Glu Gln Ile Phe Ser Asn Leu Ile Ser Asn Ala Leu		
	Asp		
40		500	505 510
	Ser Met Glu Gly Ser Ser Tyr Lys Arg Leu Asp Ile Ala Ile Arg		
	Gln		
45		515	520 525
	Ala Asn Asn Lys Val Ile Ile Thr Ile Lys Asp Ser Gly Gly Gly		
	Phe		
50		530	535 540

5 Ala Pro Glu Val Val Asp Arg Ile Phe Glu Pro Phe Phe Thr Thr
 Lys
 545 550 555
 560

10 Arg Arg Gly Met Gly Leu Gly Leu Ala Ile Val Ser Glu Ile Val
 Arg
 565 570 575

15 Asn Ser Asn Gly Ala Leu His Ala Ser Asn His Pro Glu Gly Gly
 Ala
 580 585 590

20 Val Met Thr Leu Thr Trp Pro Glu Trp Gly Glu Glu His Glu
 595 600 605

25 <210> 22 <211> 101 <212> PRT <213> Escherichia coli <400>
 22

30 Val Leu Thr Pro Gln His Leu Arg Cys Val Leu Thr Cys Ser Asp
 Leu
 1 5 10 15

35 Leu Thr Leu Leu Ser Gly Thr Val Met Ser Gln Met Pro Leu Tyr
 Phe
 20 25 30

40 Leu Asn Thr Gln Lys Lys Leu Thr Ala His Tyr Glu Trp Leu Gln
 Ile
 35 40 45

45 Asn Leu Thr Asp Thr Tyr Glu Leu Val Lys Arg Leu Met Pro Ile
 Pro
 50 55 60

50 Ser Leu Asp Val Val Val Lys Val Gly Lys Leu Val Leu Pro Glu
 Lys
 65 70 75 80

Gly His His Gly Phe Tyr Pro Glu Ala Gly Val Val Tyr Arg Thr
 Val
 85 90 95

5
 Ala Pro Glu Asn Pro
 100

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 23

Met Met Lys Asn Thr Gly Tyr Ile Leu Ala Leu Cys Leu Thr Ala
 Ser
 15 1 5 10 15

Gly His Val Leu Ala His Asp Val Trp Ile Thr Gly Lys Gln Ala
 Glu
 20 20 25 30

Asn Asn Val Thr Ala Glu Ile Gly Tyr Gly His Asn Phe Pro Ser
 Lys
 25 35 40 45

Gly Thr Ile Pro Asp Arg Arg Asp Phe Phe Glu Asn Pro Arg Leu
 Tyr
 30 50 55 60

Asn Gly Lys Glu Thr Ile Thr Leu Lys Pro Ala Ser Thr Asp Tyr
 Val
 35 65 70 75 80

Tyr Lys Thr Glu Ser Ala Ser Lys Asp Asn Gly Tyr Val Leu Ser
 Thr
 40 85 90 95

Tyr Met Lys Pro Gly Tyr Trp Ser Arg Thr Ser Ser Gly Trp Lys
 Pro
 45 100 105 110

Val Ser Arg Glu Gly Arg Asn Asp Val Ala Tyr Cys Glu Phe Val
 Thr
 50 115 120 125

Lys Tyr Ala Lys Ser Phe Ile Pro Gly Glu Gln Gln Met Pro Ala
 Gln
 130 135 140
 5

Leu Tyr Gln Ser Pro Thr Gly His Glu Leu Glu Ile Ile Pro Leu
 Ser
 145 150 155
 10 160

Asp Ile Ser Arg Phe Ser Glu Asn Val Lys Leu Lys Val Leu Tyr
 Lys
 15 165 170 175

Thr Ser Pro Leu Ala Gly Ala Ile Met Glu Leu Asp Ser Val Ser
 Tyr
 20 180 185 190

Leu Thr Ser Ser Arg His Thr His Ala Val Glu His Lys His Pro
 Val
 25 195 200 205

His Lys Ala Glu Leu Thr Phe Val Thr Asn Glu Asp Gly Ile Val
 Thr
 30 210 215 220

Val Pro Ser Leu His Ile Gly Gln Trp Leu Ala Lys Val Gln Asn
 Lys
 35 225 230 235
 240

Lys Ser Phe Gln Asp Lys Ser Leu Cys Asp Glu Thr Val Asp Val
 Ala
 40 245 250 255

Thr Leu Ser Phe Ser Arg Asn
 45 260

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Ala Ile Phe Tyr Ile Ala Ile Ser Asp Arg Asp Ser Thr Leu Ser
Arg
20 25 30

Leu Lys Ser Ala Gly Glu Asn Gly Asp Val Glu Ala Gln Tyr Ala
Leu
35 40 45

Gly Leu Met Tyr Leu Tyr Gly Glu Ile Leu Asp Val Asp Tyr Gln
Gln
50 55 60

Ala Lys Ile Trp Tyr Glu Lys Ala Ala Asp Gln Asn Asp Pro Arg
Ala
65 70 75 80

Gln Ala Lys Leu Gly Val Met Tyr Ala Asn Gly Leu Gly Val Asn
Gln
85 90 95

Asp Tyr Gln Gln Ser Lys Leu Trp Tyr Glu Lys Ala Ala Ala Gln
Asn
100 105 110

Asp Val Asp Ala Gln Phe Leu Leu Gly Glu Met Tyr Asp Asp Gly
Leu
115 120 125

Gly Val Ser Gln Asp Tyr Gln His Ala Lys Met Trp Tyr Glu Lys
Ala
130 135 140

Ala Ala Gln Asn Asp Glu Arg Ala Gln Val Asn Leu Ala Val Leu
Tyr
145 150 155
160

50

Glu Asn Gly Glu Gly Val Ser Gln Asn Tyr Gln Gln Ala Lys Ala
Trp
305 310 315
320

Tyr Glu Lys Ala Ala Ser Gln Asn Asp Ala Gln Ala Gln Phe Glu
 Leu
 325 330 335
 5

Gly Val Met Asn Glu Leu Gly Gln Gly Glu Ser Ile Asp Leu Lys
 Gln
 340 345 350
 10

Ala Arg His Tyr Tyr Glu Arg Ser Cys Asn Asn Gly Leu Lys Lys
 Gly
 355 360 365
 15

Cys Glu Arg Leu Lys Glu Leu Leu Tyr Lys
 370 375
 20

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Met Asn Val Ile Arg Thr Val Ile Cys Thr Leu Ile Ile Leu Pro
 Val
 1 5 10 15
 25

Gly Leu Gln Ala Ala Thr Ser His Ser Ser Met Val Lys Asp Thr
 Ile
 20 25 30
 30

Thr Ile Val Ala Thr Gly Asn Gln Asn Thr Val Phe Glu Thr Pro
 Ser
 35 40 45
 35

Met Val Ser Val Val Thr Asn Asp Thr Pro Trp Ser Gln Asn Ala
 Val
 50 55 60
 40

Thr Ser Ala Gly Met Leu Lys Gly Val Ala Gly Leu Ser Gln Thr
 Gly
 65 70 75 80
 45

Ala Gly Arg Thr Asn Gly Gln Thr Phe Asn Leu Arg Gly Tyr Asp
 Lys
 85 90 95
 50

5	Ser Gly Val Leu Val Leu Val Asp Gly Val Arg Gln Leu Ser Asp Met	100	105	110
10	Ala Lys Ser Ser Gly Thr Tyr Leu Asp Pro Ala Leu Val Lys Arg Ile	115	120	125
15	Glu Val Val Arg Gly Pro Asn Ser Ser Leu Tyr Gly Ser Gly Gly Leu	130	135	140
20	Gly Gly Val Val Asp Phe Arg Thr Ala Asp Ala Ala Asp Phe Leu Pro	145	150	155
	160			
25	Pro Gly Glu Thr Asn Gly Leu Ser Leu Trp Gly Asn Ile Ala Ser Gly	165	170	175
30	Asp His Ser Thr Gly Ser Gly Leu Thr Trp Phe Gly Lys Thr Gly Lys	180	185	190
35	Thr Asp Ala Leu Leu Ser Val Ile Met Arg Lys Arg Gly Asn Ile Tyr	195	200	205
40	Gln Ser Asp Gly Glu His Ala Pro Asn Lys Glu Lys Pro Ala Ala Leu	210	215	220
45	Phe Ala Lys Gly Ser Val Gly Ile Thr Asp Ser Asn Lys Ala Gly Ala	225	230	235
	240			
50	Ser Leu Arg Leu Tyr Arg Asn Asn Thr Thr Glu Pro Gly Asn Ser Thr			

		245		250		255
5	Gln Thr His Gly Asp Ser Gly Leu Arg Asp Arg Lys Thr Val Gln Asn	260	265	270		
10	Asp Val Gln Phe Trp Tyr Gln Tyr Ala Pro Val Asp Asn Ser Leu Ile	275	280	285		
15	Asn Val Lys Ser Thr Leu Tyr Leu Ser Asp Ile Thr Ile Lys Thr Asn	290	295	300		
20	Gly His Asn Lys Thr Ala Glu Trp Arg Asn Asn Arg Thr Ser Gly Val 305 320	310	315			
25	Asn Val Val Asn Arg Ser His Thr Leu Ile Phe Pro Gly Ala His Gln	325	330	335		
30	Leu Ser Tyr Gly Ala Glu Tyr Tyr Arg Gln Gln Gln Lys Pro Glu Gly	340	345	350		
35	Ser Ala Thr Leu Tyr Pro Glu Gly Asn Ile Asp Phe Thr Ser Leu Tyr	355	360	365		
40	Phe Gln Asp Glu Met Thr Met Lys Ser Tyr Pro Val Asn Ile Ile Val	370	375	380		
45	Gly Ser Arg Tyr Asp Arg Tyr Lys Ser Phe Asn Pro Arg Ala Gly Glu 385 400	390	395			
50						

Leu Lys Ala Glu Arg Leu Ser Pro Arg Ala Ala Ile Ser Val Ser
 Pro
 405 410 415

5 Thr Asp Trp Leu Met Met Tyr Gly Ser Ile Ser Ser Ala Phe Arg
 Ala
 420 425 430

10 Pro Thr Met Ala Glu Met Tyr Arg Asp Asp Val His Phe Tyr Arg
 Lys
 435 440 445

15 Gly Lys Pro Asn Tyr Trp Val Pro Asn Leu Asn Leu Lys Pro Glu
 Asn
 450 455 460

20 Asn Ile Thr Arg Glu Ile Gly Ala Gly Ile Gln Leu Asp Gly Leu
 Leu
 465 470 475
 480

25 Thr Asp Asn Asp Arg Leu Gln Leu Lys Gly Gly Tyr Phe Gly Thr
 Asp
 485 490 495

30 Ala Arg Asn Tyr Ile Ala Thr Arg Val Asp Met Lys Arg Met Arg
 Ser
 500 505 510

35 Tyr Ser Tyr Asn Val Ser Arg Ala Arg Ile Trp Gly Trp Asp Met
 Gln
 515 520 525

40 Gly Asn Tyr Gln Ser Asp Tyr Val Asp Trp Met Leu Ser Tyr Asn
 Arg
 530 535 540

45 Thr Glu Ser Met Asp Ala Ser Ser Arg Glu Trp Leu Gly Ser Gly
 Asn
 545 550 555
 560

50

Pro Asp Thr Leu Ile Ser Asp Ile Ser Ile Pro Val Gly His Arg
 Gly
 565 570 575
 5

Val Tyr Ala Gly Trp Arg Ala Glu Leu Ser Ala Ser Ala Thr His
 Val
 580 585 590
 10

Lys Lys Gly Asp Pro His Gln Ala Gly Tyr Thr Ile His Ser Phe
 Ser
 595 600 605
 15

Leu Ser Tyr Lys Pro Val Ser Val Lys Gly Phe Glu Ala Ser Val
 Thr
 610 615 620
 20

Leu Asp Asn Ala Phe Asn Lys Leu Ala Met Asn Gly Lys Gly Val
 Pro
 625 630 635
 25 640

Leu Ser Gly Arg Thr Val Ser Leu Tyr Thr Arg Tyr Gln Trp
 645 650
 30

<210> 26 <211> 1376 <212> PRT <213> Escherichia coli
 <400> 26

35 Met Asn Lys Ile Tyr Ala Leu Lys Tyr Cys Tyr Ile Thr Asn Thr
 Val
 1 5 10 15

40 Lys Val Val Ser Glu Leu Ala Arg Arg Val Cys Lys Gly Ser Thr
 Arg
 20 25 30

45 Arg Gly Lys Arg Leu Ser Val Leu Thr Ser Leu Ala Leu Ser Ala
 Leu
 35 40 45

50 Leu Pro Thr Val Ala Gly Ala Ser Thr Val Gly Gly Asn Asn Pro
 Tyr

	50		55		60
5	Gln Thr Tyr Arg Asp Phe Ala Glu Asn Lys Gly Gln Phe Gln Ala Gly 65		70		75 80
10	Ala Thr Asn Ile Pro Ile Phe Asn Asn Lys Gly Glu Leu Val Gly His	85		90	95
15	Leu Asp Lys Ala Pro Met Val Asp Phe Ser Ser Val Asn Val Ser Ser	100		105	110
20	Asn Pro Gly Val Ala Thr Leu Ile Asn Pro Gln Tyr Ile Ala Ser Val	115		120	125
25	Lys His Asn Lys Gly Tyr Gln Ser Val Ser Phe Gly Asp Gly Gln Asn	130		135	140
30	Ser Tyr His Ile Val Asp Arg Asn Glu His Ser Ser Ser Asp Leu His 145 160	150		155	
35	Thr Pro Arg Leu Asp Lys Leu Val Thr Glu Val Ala Pro Ala Thr Val	165		170	175
40	Thr Ser Ser Ser Thr Ala Asp Ile Leu Asn Pro Ser Lys Tyr Ser Ala	180		185	190
45	Phe Tyr Arg Ala Gly Ser Gly Ser Gln Tyr Ile Gln Asp Ser Gln Gly	195		200	205
50	Lys Arg His Trp Val Thr Gly Gly Tyr Gly Tyr Leu Thr Gly Gly Ile				

	210	215	220
5	Leu Pro Thr Ser Phe Phe Tyr His Gly Ser Asp Gly Ile Gln Leu Tyr 225 240	230	235
10	Met Gly Gly Asn Ile His Asp His Ser Ile Leu Pro Ser Phe Gly Glu	245	250 255
15	Ala Gly Asp Ser Gly Ser Pro Leu Phe Gly Trp Asn Thr Ala Lys Gly	260	265 270
20	Gln Trp Glu Leu Val Gly Val Tyr Ser Gly Val Gly Gly Gly Thr Asn	275	280 285
25	Leu Ile Tyr Ser Leu Ile Pro Gln Ser Phe Leu Ser Gln Ile Tyr Ser	290	295 300
30	Glu Asp Asn Asp Ala Pro Val Phe Phe Asn Ala Ser Ser Gly Ala Pro 305 320	310	315
35	Leu Gln Trp Lys Phe Asp Ser Ser Thr Gly Thr Gly Ser Leu Lys Gln	325	330 335
40	Gly Ser Asp Glu Tyr Ala Met His Gly Gln Lys Gly Ser Asp Leu Asn	340	345 350
45	Ala Gly Lys Asn Leu Thr Phe Leu Gly His Asn Gly Gln Ile Asp Leu	355	360 365
50			

	Glu	Asn	Ser	Val	Thr	Gln	Gly	Ala	Gly	Ser	Leu	Thr	Phe	Thr	Asp
	Asp														
	370						375					380			
5	Tyr	Thr	Val	Thr	Thr	Ser	Asn	Gly	Ser	Thr	Trp	Thr	Gly	Ala	Gly
	Ile														
	385						390					395			
	400														
10	Ile	Val	Asp	Lys	Asp	Ala	Ser	Val	Asn	Trp	Gln	Val	Asn	Gly	Val
	Lys														
					405					410					415
15	Gly	Asp	Asn	Leu	His	Lys	Ile	Gly	Glu	Gly	Thr	Leu	Val	Val	Gln
	Gly														
				420					425					430	
20	Thr	Gly	Val	Asn	Glu	Gly	Gly	Leu	Lys	Val	Gly	Asp	Gly	Thr	Val
	Val														
			435					440					445		
25	Leu	Asn	Gln	Gln	Ala	Asp	Ser	Ser	Gly	His	Val	Gln	Ala	Phe	Ser
	Ser														
	450						455					460			
30	Val	Asn	Ile	Ala	Ser	Gly	Arg	Pro	Thr	Val	Val	Leu	Ala	Asp	Asn
	Gln														
	465						470					475			
35	480														
	Gln	Val	Asn	Pro	Asp	Asn	Ile	Ser	Trp	Gly	Tyr	Arg	Gly	Gly	Val
	Leu														
40					485					490					495
	Asp	Val	Asn	Gly	Asn	Asp	Leu	Thr	Phe	His	Lys	Leu	Asn	Ala	Ala
	Asp														
45				500					505					510	
	Tyr	Gly	Ala	Thr	Leu	Gly	Asn	Ser	Ser	Asp	Lys	Thr	Ala	Asn	Ile
	Thr														
50			515					520					525		

	Leu Asp Tyr Gln Thr Arg Pro Ala Asp Val Lys Val Asn Glu Trp	
	Ser	
5	530 535 540	
	Ser Ser Asn Arg Gly Thr Val Gly Ser Leu Tyr Ile Tyr Asn Asn	
	Pro	
10	545 550 555	
	560	
	Tyr Thr His Thr Val Asp Tyr Phe Ile Leu Lys Thr Ser Ser Tyr	
	Gly	
15	565 570 575	
	Trp Phe Pro Thr Gly Gln Val Ser Asn Glu His Trp Glu Tyr Val	
	Gly	
20	580 585 590	
	His Asp Gln Asn Ser Ala Gln Ala Leu Leu Ala Asn Arg Ile Asn	
	Asn	
25	595 600 605	
	Lys Gly Tyr Leu Tyr His Gly Lys Leu Leu Gly Asn Ile Asn Phe	
	Ser	
30	610 615 620	
	Asn Lys Ala Thr Pro Gly Thr Thr Gly Ala Leu Val Met Asp Gly	
	Ser	
35	625 630 635	
	640	
	Ala Asn Met Ser Gly Thr Phe Thr Gln Glu Asn Gly Arg Leu Thr	
	Ile	
40	645 650 655	
	Gln Gly His Pro Val Ile His Ala Ser Thr Ser Gln Ser Ile Ala	
	Asn	
45	660 665 670	
	Thr Val Ser Ser Leu Gly Asp Asn Ser Val Leu Thr Gln Pro Thr	
	Ser	
50	675 680 685	

5	Phe Thr Gln Asp Asp Trp Glu Asn Arg Thr Phe Ser Phe Gly Ser Leu	690	695	700
10	Val Leu Lys Asp Thr Asp Phe Gly Leu Gly Arg Asn Ala Thr Leu Asn	705	710	715
		720		
15	Thr Thr Ile Gln Ala Asp Asn Ser Ser Val Thr Leu Gly Asp Ser Arg	725	730	735
20	Val Phe Ile Asp Lys Lys Asp Gly Gln Gly Thr Ala Phe Thr Leu Glu	740	745	750
25	Glu Gly Thr Ser Val Ala Thr Lys Asp Ala Asp Lys Ser Val Phe Asn	755	760	765
30	Gly Thr Val Asn Leu Asp Asn Gln Ser Val Leu Asn Ile Asn Glu Ile	770	775	780
35	Phe Asn Gly Gly Ile Gln Ala Asn Asn Ser Thr Val Asn Ile Ser Ser	785	790	795
		800		
40	Asp Ser Ala Val Leu Glu Asn Ser Thr Leu Thr Ser Thr Ala Leu Asn	805	810	815
45	Leu Asn Lys Gly Ala Asn Val Leu Ala Ser Gln Ser Phe Val Ser Asp	820	825	830
50	Gly Pro Val Asn Ile Ser Asp Ala Thr Leu Ser Leu Asn Ser Arg Pro			

835

840

845

5	Asp	Glu	Val	Ser	His	Thr	Leu	Leu	Pro	Val	Tyr	Asp	Tyr	Ala	Gly
	Ser														
		850					855					860			
10	Trp	Asn	Leu	Lys	Gly	Asp	Asp	Ala	Arg	Leu	Asn	Val	Gly	Pro	Tyr
	Ser														
	865					870					875				
	880														
15	Met	Leu	Ser	Gly	Asn	Ile	Asn	Val	Gln	Asp	Lys	Gly	Thr	Val	Thr
	Leu														
					885				890					895	
20	Gly	Gly	Glu	Gly	Glu	Leu	Ser	Pro	Asp	Leu	Thr	Leu	Gln	Asn	Gln
	Met														
					900				905					910	
25	Leu	Tyr	Ser	Leu	Phe	Asn	Gly	Tyr	Arg	Asn	Thr	Trp	Ser	Gly	Ser
	Leu														
			915					920					925		
30	Asn	Ala	Pro	Asp	Ala	Thr	Val	Ser	Met	Thr	Asp	Thr	Gln	Trp	Ser
	Met														
		930					935					940			
35	Asn	Gly	Asn	Ser	Thr	Ala	Gly	Asn	Met	Lys	Leu	Asn	Arg	Thr	Ile
	Val														
	945					950					955				
	960														
40	Gly	Phe	Asn	Gly	Gly	Thr	Ser	Ser	Phe	Thr	Thr	Leu	Thr	Thr	Asp
	Asn														
					965				970					975	
45	Leu	Asp	Ala	Val	Gln	Ser	Ala	Phe	Val	Met	Arg	Thr	Asp	Leu	Asn
	Lys														
				980				985						990	

50

	Ala	Asp	Lys	Leu	Val	Ile	Asn	Lys	Ser	Ala	Thr	Gly	His	Asp	Asn
	Ser														
			995					1000						1005	
5	Ile	Trp	Val	Asn	Phe	Leu	Lys	Lys	Pro	Ser	Asp	Lys	Asp	Thr	Leu
	1010						1015					1020			
10	Asp	Ile	Pro	Leu	Val	Ser	Ala	Pro	Glu	Ala	Thr	Ala	Asp	Asn	Leu
	1025						1030					1035			
15	Phe	Arg	Ala	Ser	Thr	Arg	Val	Val	Gly	Phe	Ser	Asp	Val	Thr	Pro
	1040						1045					1050			
20	Thr	Leu	Ser	Val	Arg	Lys	Glu	Asp	Gly	Lys	Lys	Glu	Trp	Val	Leu
	1055						1060					1065			
25	Asp	Gly	Tyr	Gln	Val	Ala	Arg	Asn	Asp	Gly	Gln	Gly	Lys	Ala	Ala
	1070						1075					1080			
30	Ala	Thr	Phe	Met	His	Ile	Ser	Tyr	Asn	Asn	Phe	Ile	Thr	Glu	Val
	1085						1090					1095			
35	Asn	Asn	Leu	Asn	Lys	Arg	Met	Gly	Asp	Leu	Arg	Asp	Ile	Asn	Gly
	1100						1105					1110			
40	Glu	Ala	Gly	Thr	Trp	Val	Arg	Leu	Leu	Asn	Gly	Ser	Gly	Ser	Ala
	1115						1120					1125			
45	Asp	Gly	Gly	Phe	Thr	Asp	His	Tyr	Thr	Leu	Leu	Gln	Met	Gly	Ala
	1130						1135					1140			
50	Asp	Arg	Lys	His	Glu	Leu	Gly	Ser	Met	Asp	Leu	Phe	Thr	Gly	Val
	1145						1150					1155			
55	Met	Ala	Thr	Tyr	Thr	Asp	Thr	Asp	Ala	Ser	Ala	Gly	Leu	Tyr	Ser
	1160						1165					1170			
60	Gly	Lys	Thr	Lys	Ser	Trp	Gly	Gly	Gly	Phe	Tyr	Ala	Ser	Gly	Leu
	1175						1180					1185			

5 Phe Arg Ser Gly Ala Tyr Phe Asp Leu Ile Ala Lys Tyr Ile His
 1190 1195 1200
 Asn Glu Asn Lys Tyr Asp Leu Asn Phe Ala Gly Ala Gly Lys Gln
 1205 1210 1215
 10 Asn Phe Arg Ser His Ser Leu Tyr Ala Gly Ala Glu Val Gly Tyr
 1220 1225 1230
 15 Arg Tyr His Leu Thr Asp Thr Thr Phe Val Glu Pro Gln Ala Glu
 1235 1240 1245
 20 Leu Val Trp Gly Arg Leu Gln Gly Gln Thr Phe Asn Trp Asn Asp
 1250 1255 1260
 Ser Gly Met Asp Val Ser Met Arg Arg Asn Ser Val Asn Pro Leu
 1265 1270 1275
 25 Val Gly Arg Thr Gly Val Val Ser Gly Lys Thr Phe Ser Gly Lys
 1280 1285 1290
 30 Asp Trp Ser Leu Thr Ala Arg Ala Gly Leu His Tyr Glu Phe Asp
 1295 1300 1305
 35 Leu Thr Asp Ser Ala Asp Val His Leu Lys Asp Ala Ala Gly Glu
 1310 1315 1320
 40 His Gln Ile Asn Gly Arg Lys Asp Gly Arg Met Leu Tyr Gly Val
 1325 1330 1335
 Gly Leu Asn Ala Arg Phe Gly Asp Asn Thr Arg Leu Gly Leu Glu
 1340 1345 1350
 45 Val Glu Arg Ser Ala Phe Gly Lys Tyr Asn Thr Asp Asp Ala Ile
 1355 1360 1365
 50 Asn Ala Asn Ile Arg Tyr Ser Phe

1370

1375

5 <210> 27 <211> 349 <212> PRT <213> Escherichia coli <400>
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 Met Ile Thr Leu Phe Arg Leu Leu Ala Ile Leu Cys Leu Phe Phe
 Asn
 1 5 10 15
 10
 Val Ser Ala Phe Ala Val Asp Cys Tyr Gln Asp Gly Tyr Arg Gly
 Thr
 20 25 30
 15
 Thr Leu Ile Asn Gly Asp Leu Pro Thr Phe Lys Ile Pro Glu Asn
 Ala
 35 40 45
 20
 Gln Pro Gly Gln Lys Ile Trp Glu Ser Gly Asp Ile Asn Ile Thr
 Val
 50 55 60
 25
 Tyr Cys Asp Asn Ala Pro Gly Trp Ser Ser Asn Asn Pro Ser Glu
 Asn
 65 70 75 80
 30
 Val Tyr Ala Trp Ile Lys Leu Pro Gln Ile Asn Ser Ala Asp Met
 Leu
 85 90 95
 35
 Asn Asn Pro Tyr Leu Thr Phe Gly Val Thr Tyr Asn Gly Val Asp
 Tyr
 100 105 110
 40
 Glu Gly Thr Asn Glu Lys Ile Asp Thr His Ala Cys Leu Asp Lys
 Tyr
 115 120 125
 45
 Glu Gln Tyr Tyr Asn Gly Tyr Tyr His Asp Pro Val Cys Asn Gly
 Ser
 130 135 140
 50

Thr Leu Gln Lys Asn Val Thr Phe Asn Ala His Phe Arg Val Tyr
 Val
 145 150 155
 160
 5

Lys Phe Lys Ser Arg Pro Ala Gly Asp Gln Thr Val Asn Phe Gly
 Thr
 165 170 175
 10

Val Asn Val Leu Gln Phe Asp Gly Glu Gly Gly Ala Asn Met Ala
 Pro
 180 185 190
 15

Asn Ala Lys Asn Leu Arg Tyr Ala Ile Thr Gly Leu Asp Asn Ile
 Ser
 195 200 205
 20

Phe Leu Asp Cys Ser Val Asp Val Arg Ile Ser Pro Glu Ser Gln
 Ile
 210 215 220
 25

Val Asn Phe Gly Gln Ile Ala Ala Asn Ser Ile Ala Thr Phe Pro
 Pro
 225 230 235
 240
 30

Lys Ala Ala Phe Ser Val Ser Thr Ile Lys Asp Ile Ala Ser Asp
 Cys
 245 250 255
 35

Thr Glu Gln Phe Asp Val Ala Thr Ser Phe Phe Thr Ser Asp Thr
 Leu
 260 265 270
 40

Tyr Asp Asn Thr His Leu Glu Ile Gly Asn Gly Leu Leu Met Arg
 Ile
 275 280 285
 45

Thr Asp Gln Lys Thr Gln Glu Asp Ile Lys Phe Asn Gln Phe Lys
 Leu
 290 295 300
 50

Phe Ser Thr Tyr Ile Pro Gly Gln Ser Ala Ala Met Ala Thr Arg
 Asp
 305 310 315
 5 320

Tyr Gln Ala Glu Leu Thr Gln Lys Pro Gly Glu Pro Leu Val Tyr
 Gly
 10 325 330 335

Pro Phe Gln Lys Asp Leu Ile Val Lys Ile Asn Tyr His
 340 345
 15

<210> 28 <211> 840 <212> PRT <213> Escherichia coli <400>
 28

20 Met Asn Asn Lys Asn Thr Phe Ser Arg Asp Lys Leu Ser His Ala
 Ile
 1 5 10 15

25 Lys Asn Ala Leu Ser Gly Val Val Cys Ser Leu Leu Phe Val Leu
 Pro
 20 25 30

30 Val His Ala Val Glu Phe Asn Val Asp Met Ile Asp Ala Glu Asp
 Arg
 35 40 45

35 Glu Asn Ile Asp Ile Ser Arg Phe Glu Lys Lys Gly Tyr Ile Pro
 Pro
 50 55 60

40 Gly Arg Tyr Leu Val Arg Val Gln Ile Asn Lys Asn Met Leu Pro
 Gln
 65 70 75 80

45 Thr Leu Ile Leu Glu Trp Val Lys Ala Asp Asn Glu Ser Gly Ser
 Leu
 85 90 95

50 Leu Cys Leu Thr Lys Glu Asn Leu Thr Asn Phe Gly Leu Asn Thr
 Glu

	100	105	110
5	Phe Ile Glu Ser Leu Gln Asn Ile Ala Gly Ser Glu Cys Leu Asp Leu		
	115	120	125
10	Ser Gln Arg Gln Glu Leu Thr Thr Arg Leu Asp Lys Ala Thr Met Ile		
	130	135	140
15	Leu Ser Leu Ser Val Pro Gln Ala Trp Leu Lys Tyr Gln Ala Thr Asn		
	145	150	155
	160		
20	Trp Thr Pro Pro Glu Phe Trp Asp Thr Gly Ile Thr Gly Phe Ile Leu		
	165	170	175
25	Asp Tyr Asn Val Tyr Ala Ser Gln Tyr Ala Pro His His Gly Asp Ser		
	180	185	190
30	Thr Gln Asn Val Ser Ser Tyr Gly Thr Leu Gly Phe Asn Leu Gly Ala		
	195	200	205
35	Trp Arg Leu Arg Ser Asp Tyr Gln Tyr Asn Gln Asn Phe Ala Asp Gly		
	210	215	220
40	Arg Ser Val Asn Arg Asp Ser Glu Phe Ala Arg Thr Tyr Leu Phe Arg		
	225	230	235
	240		
45	Pro Ile Pro Ser Trp Ser Ser Lys Phe Thr Met Gly Gln Tyr Asp Leu		
	245	250	255
50			

86/370

	Ser	Ser	Asn	Leu	Tyr	Asp	Thr	Phe	His	Phe	Thr	Gly	Ala	Ser	Leu
	Glu														
				260					265					270	
5	Ser	Asp	Glu	Ser	Met	Leu	Pro	Pro	Asp	Leu	Gln	Gly	Tyr	Ala	Pro
	Gln														
			275					280					285		
10	Ile	Thr	Gly	Ile	Ala	Gln	Thr	Asn	Ala	Lys	Val	Thr	Val	Ala	Gln
	Asn														
			290				295					300			
15	Gly	Arg	Val	Leu	Tyr	Gln	Thr	Thr	Val	Ala	Pro	Gly	Pro	Phe	Thr
	Ile														
	305					310						315			
	320														
20	Ser	Asp	Leu	Gly	Gln	Ser	Phe	Gln	Gly	Gln	Leu	Asp	Val	Thr	Val
	Glu														
				325					330					335	
25	Glu	Glu	Asp	Gly	Arg	Thr	Ser	Thr	Phe	Gln	Val	Gly	Ser	Ala	Ser
	Ile														
				340					345					350	
30	Pro	Tyr	Leu	Thr	Arg	Lys	Gly	Gln	Val	Arg	Tyr	Lys	Thr	Ser	Leu
	Gly														
			355					360					365		
35	Lys	Pro	Thr	Ser	Val	Gly	His	Asn	Asp	Ile	Asn	Asn	Pro	Phe	Phe
	Trp														
		370					375				380				
40	Thr	Ala	Glu	Ala	Ser	Trp	Gly	Trp	Leu	Asn	Asn	Val	Ser	Leu	Tyr
	Gly														
	385					390					395				
45	400														
50	Gly	Gly	Met	Phe	Thr	Ala	Asp	Asp	Tyr	Gln	Ala	Ile	Thr	Thr	Gly
	Ile														
				405					410					415	

	Gly	Phe	Asn	Leu	Asn	Gln	Phe	Gly	Ser	Leu	Ser	Phe	Asp	Val	Thr
	Gly														
5				420					425					430	
	Ala	Asp	Ala	Ser	Leu	Gln	Gln	Gln	Asn	Ser	Gly	Asn	Leu	Arg	Gly
	Tyr														
10			435					440					445		
	Ser	Tyr	Arg	Phe	Asn	Tyr	Ala	Lys	His	Phe	Glu	Ser	Thr	Gly	Ser
	Gln														
15			450					455					460		
	Ile	Thr	Phe	Ala	Gly	Tyr	Arg	Phe	Ser	Asp	Lys	Asp	Tyr	Val	Ser
	Met														
20	465					470						475			
	480														
	Ser	Glu	Tyr	Leu	Ser	Ser	Arg	Asn	Gly	Asp	Glu	Ser	Ile	Asp	Asn
	Glu														
25					485					490				495	
	Lys	Glu	Ser	Tyr	Val	Ile	Ser	Leu	Asn	Gln	Tyr	Phe	Glu	Thr	Leu
	Glu														
30				500					505					510	
	Leu	Asn	Ser	Tyr	Leu	Asn	Val	Thr	Arg	Asn	Thr	Tyr	Trp	Asp	Ser
	Ala														
35			515					520					525		
	Ser	Asn	Thr	Asn	Tyr	Ser	Val	Ser	Val	Ser	Lys	Asn	Phe	Asp	Ile
	Gly														
40			530					535					540		
	Asp	Phe	Lys	Gly	Ile	Ser	Ala	Ser	Leu	Ala	Val	Ser	Arg	Ile	Arg
	Trp														
45	545					550					555				
	560														
	Asp	Asp	Asp	Glu	Glu	Asn	Gln	Tyr	Tyr	Phe	Ser	Phe	Ser	Leu	Pro
	Leu														
50															
				565					570					575	

5	Gln Gln Asn Arg Asn Ile Ser Tyr Ser Met Gln Arg Thr Gly Ser Ser	580	585	590
10	Asn Thr Ser Gln Met Ile Ser Trp Tyr Asp Ser Ser Asp Arg Asn Asn	595	600	605
15	Ile Trp Asn Ile Ser Ala Ser Ala Thr Asp Asp Asn Ile Arg Asp Gly	610	615	620
20	Glu Pro Thr Leu Arg Gly Ser Tyr Gln His Tyr Ser Pro Trp Gly Arg 625 640	630	635	
25	Leu Asn Ile Asn Gly Ser Val Gln Pro Asn Gln Tyr Asn Ser Val Thr	645	650	655
30	Ala Gly Trp Tyr Gly Ser Leu Thr Ala Thr Arg His Gly Val Ala Leu	660	665	670
35	His Asp Tyr Ser Tyr Gly Asp Asn Ala Arg Met Met Val Asp Thr Asp	675	680	685
40	Gly Ile Ser Gly Ile Glu Ile Asn Ser Asn Arg Thr Val Thr Asn Gly	690	695	700
45	Leu Gly Ile Ala Val Ile Pro Ser Leu Ser Asn Tyr Thr Thr Ser Met 705 720	710	715	
50	Leu Arg Val Asn Asn Asn Asp Leu Pro Glu Gly Val Asp Val Glu Asn			

		725		730		735
5	Ser Val Ile Arg Thr Thr Leu Thr Gln Gly Ala Ile Gly Tyr Ala Lys	740		745		750
10	Leu Asn Ala Thr Thr Gly Tyr Gln Ile Val Gly Val Ile Arg Gln Glu	755		760		765
15	Asn Gly Arg Phe Pro Pro Leu Gly Val Asn Val Thr Asp Lys Ala Thr	770		775		780
20	Gly Lys Asp Val Gly Leu Val Ala Glu Asp Gly Phe Val Tyr Leu Ser 785 800		790		795	
25	Gly Ile Gln Glu Asn Ser Ile Leu His Leu Thr Trp Gly Asp Asn Thr		805		810	815
30	Cys Glu Val Thr Pro Pro Asn Gln Ser Asn Ile Ser Glu Ser Ala Ile		820		825	830
35	Ile Leu Pro Cys Lys Thr Val Lys 835				840	
40	<210> 29 <211> 169 <212> PRT <213> Escherichia coli <400> 29					
45	Leu Met Asn Thr Lys Gln Ser Val Ala Gln Leu Ala Val Pro His Arg 1		5		10	15
50	Lys Arg Leu Ser Ser Thr Met Val Val Ala Leu Leu Leu Cys Val Val		20		25	30

Met Val Leu Leu Ala Gly Ala Ala Leu Ser Ile Ala Pro Val Gln
50
Ala
1 5 10 15

5	Ala	Ser	Tyr	Pro	Thr	Lys	Gln	Ile	Glu	Leu	Val	Val	Pro	Tyr	Ala	
	Ala															
				20					25					30		
10	Gly	Gly	Gly	Thr	Asp	Leu	Val	Ala	Arg	Ala	Phe	Ala	Asp	Ala	Ala	
	Lys															
			35					40					45			
15	Asn	His	Leu	Pro	Val	Ser	Ile	Gly	Val	Ile	Asn	Lys	Pro	Gly	Gly	
	Gly															
		50						55				60				
20	Gly	Ala	Ile	Gly	Leu	Ser	Glu	Ile	Ala	Ala	Ala	Arg	Pro	Asn	Gly	
	Tyr															
	65					70					75				80	
25	Lys	Ile	Gly	Leu	Gly	Thr	Val	Glu	Leu	Thr	Thr	Leu	Pro	Ser	Leu	
	Gly															
					85					90					95	
30	Met	Val	Arg	Phe	Lys	Thr	Ser	Asp	Phe	Lys	Pro	Ile	Ala	Arg	Leu	
	Asn															
				100					105					110		
35	Ala	Asp	Pro	Ala	Ala	Ile	Thr	Val	Arg	Ala	Asp	Ala	Pro	Trp	Asn	
	Ser															
			115					120					125			
40	Tyr	Glu	Glu	Phe	Met	Ala	Tyr	Ser	Lys	Ala	Asn	Pro	Gly	Lys	Val	
	Arg															
		130						135					140			
45	Ile	Gly	Asn	Ser	Gly	Thr	Gly	Ala	Ile	Trp	His	Leu	Ala	Ala	Ala	
	Ala															
	145					150					155					
	160															
50	Leu	Glu	Asp	Lys	Thr	Gly	Thr	Lys	Phe	Ser	His	Val	Pro	Tyr	Asp	
	Gly															
					165					170					175	

Ala Ala Pro Ala Ile Thr Gly Leu Leu Gly Gly His Ile Glu Ala
 Val
 5 180 185 190

Ser Val Ser Pro Gly Glu Val Ile Asn His Val Asn Gly Gly Lys
 Leu
 10 195 200 205

Lys Thr Leu Val Val Met Ala Asp Glu Arg Met Lys Thr Met Pro
 Asp
 15 210 215 220

Val Pro Thr Leu Lys Glu Lys Gly Val Asp Leu Ser Ile Gly Thr
 Trp
 20 225 230 235
 240

Arg Gly Leu Ile Val Ser Gln Lys Thr Pro Gln Asp Val Val Asp
 Val
 25 245 250 255

Leu Ala Lys Ala Ala Lys Glu Thr Ala Glu Glu Pro Ala Phe Gln
 Asp
 30 260 265 270

Ala Leu Gln Lys Leu Asn Leu Asn Tyr Ala Trp Leu Asp Ala Ala
 Ser
 35 275 280 285

Phe Gln Thr Gln Ile Ser Glu Gln Glu Lys Tyr Phe Asp Glu Leu
 Leu
 40 290 295 300

Thr Arg Leu Gly Leu Lys Lys
 45 305 310

<210> 31 <211> 722 <212> PRT <213> Escherichia coli <400>
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Met Leu Arg Trp Lys Arg Cys Ile Ile Leu Thr Phe Ile Ser Gly
Ala
1          5          10          15

5
Ala Phe Ala Ala Pro Glu Ile Asn Val Lys Gln Asn Glu Ser Leu
Pro
          20          25          30

10
Asp Leu Gly Ser Gln Ala Ala Gln Gln Asp Glu Gln Thr Asn Lys
Gly
          35          40          45

15
Lys Ser Leu Lys Glu Arg Gly Ala Asp Tyr Val Ile Asn Ser Ala
Thr
          50          55          60

20
Gln Gly Phe Glu Asn Leu Thr Pro Glu Ala Leu Glu Ser Gln Ala
Arg
65          70          75          80

25
Ser Tyr Leu Gln Ser Gln Ile Thr Ser Thr Ala Gln Ser Tyr Ile
Glu
          85          90          95

30
Asp Thr Leu Ser Pro Tyr Gly Lys Val Arg Leu Asn Leu Ser Ile
Gly
          100          105          110

35
Gln Gly Gly Asp Leu Asp Gly Ser Ser Ile Asp Tyr Phe Val Pro
Trp
          115          120          125

40
Tyr Asp Asn Gln Thr Thr Val Tyr Phe Ser Gln Phe Ser Ala Gln
Arg
          130          135          140

45
Lys Glu Asp Arg Thr Ile Gly Asn Ile Gly Leu Gly Val Arg Tyr
Asn
145          150          155
160

50

```

Phe Asp Lys Tyr Leu Leu Gly Gly Asn Ile Phe Tyr Asp Tyr Asp
 Phe
 165 170 175

5 Thr Arg Gly His Arg Arg Leu Gly Leu Gly Ala Glu Ala Trp Thr
 Asp
 180 185 190

10 Tyr Leu Lys Phe Ser Gly Asn Tyr Tyr His Pro Leu Ser Asp Trp
 Lys
 195 200 205

15 Asp Ser Glu Asp Phe Asp Phe Tyr Glu Glu Arg Pro Ala Arg Gly
 Trp
 210 215 220

20 Asp Ile Arg Ala Glu Val Trp Leu Pro Ser Tyr Pro Gln Leu Gly
 Gly
 225 230 235
 240

25 Lys Ile Val Phe Glu Gln Tyr Tyr Gly Asp Glu Val Ala Leu Phe
 Gly
 245 250 255

30 Thr Asp Asn Leu Glu Lys Asp Pro Tyr Ala Val Thr Leu Gly Leu
 Asn
 260 265 270

35 Tyr Gln Pro Val Pro Leu Leu Thr Val Gly Thr Asp Tyr Lys Ala
 Gly
 275 280 285

40 Thr Gly Asp Asn Ser Asp Val Ser Ile Asn Ala Thr Leu Asn Tyr
 Gln
 290 295 300

45 Phe Gly Val Pro Leu Lys Asp Gln Leu Asp Ser Asp Lys Val Lys
 Ala
 305 310 315

50 320

	Ala His Ser Leu Met Gly Ser Arg Leu Asp Phe Val Glu Arg Asn	
	Asn	
5	325	330 335
	Phe Ile Val Leu Glu Tyr Lys Glu Lys Asp Pro Leu Asp Val Thr	
	Leu	
10	340	345 350
	Trp Leu Lys Ala Asp Ala Thr Asn Glu His Pro Glu Cys Val Ile	
	Lys	
15	355	360 365
	Asp Thr Pro Glu Ala Ala Val Gly Leu Glu Lys Cys Lys Trp Thr	
	Ile	
20	370	375 380
	Asn Ala Leu Ile Asn His His Tyr Lys Ile Val Ala Ala Ser Trp	
	Gln	
25	385	390 395
	400	
	Ala Lys Asn Asn Ala Ala Arg Thr Leu Val Met Pro Val Ile Lys	
	Glu	
30	405	410 415
	Asn Thr Leu Thr Glu Gly Asn Asn Asn His Trp Asn Leu Val Leu	
	Pro	
35	420	425 430
	Ala Trp Gln Tyr Ser Ser Asp Gln Ala Glu Gln Glu Lys Leu Asn	
	Thr	
40	435	440 445
	Trp Arg Val Arg Leu Ala Leu Glu Asp Glu Lys Gly Asn Arg Gln	
	Asn	
45	450	455 460
	Ser Gly Val Val Glu Ile Thr Val Gln Gln Asp Arg Lys Ile Glu	
	Leu	
50	465	470 475
	480	

5	Ile Val Asn Asn Ile Ala Asn Pro Glu Glu Asn Asn His Ser His Glu	485	490	495
10	Ala Ser Ala Gln Ala Asp Gly Val Asp Gly Val Val Met Asp Leu Asp	500	505	510
15	Val Thr Asp Ser Phe Gly Asp Asn Thr Asp Arg Asn Gly Asp Ala Leu	515	520	525
20	Pro Glu Asp Asn Leu Thr Pro Gln Leu Tyr Asp Ala Gln Asp Lys Arg	530	535	540
25	Val Thr Leu Thr Asn Lys Pro Cys Ser Thr Asp Asn Pro Cys Val Phe	545	550	555
		560		
30	Ile Ala Lys Gln Asp Lys Glu Lys Gly Thr Val Thr Leu Ser Ser Thr	565	570	575
35	Leu Pro Gly Thr Tyr Arg Trp Lys Ala Lys Ala Ala Pro Tyr Asp Asp	580	585	590
40	Ser Asn Tyr Val Asp Val Thr Phe Leu Gly Ala Glu Ile Gly Gly Leu	595	600	605
45	Asn Ala Phe Ile Tyr Arg Val Gly Ala Ala Lys Pro Ser Asn Leu Ile	610	615	620
50	Gly Lys Asp Lys Glu Pro Leu Pro Ser Thr Thr Phe Ile Asp Leu Phe			

625		630		635
640				
5	Tyr Gly Ala Thr Thr Ile Lys Thr Val Ser Ser Ser Arg Ser Lys Asn			
		645	650	655
10	Leu Thr Lys Arg Trp Cys Ser Thr Thr Thr Ser Gly Asn Leu Pro Ala			
		660	665	670
15	Arg Ala Ser Met Val Ser Gly Cys Thr Gly Glu His Ser Asn Glu Asp			
		675	680	685
20	Ile Val Ile Pro Ala Thr Asn Arg Glu Ala Ala Gln Thr Tyr Gly Ala			
		690	695	700
25	Gln Ala Gly Asp Gly Leu Gln Gly Tyr Gly Leu Arg Val Leu Tyr Thr			
		705	710	715
		720		
30	Lys Lys			
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	Ala Leu Ala Gly Tyr Cys Val Ala Pro Val Ala Leu Ala Glu Asp Ser			
45	20 25 30			
	Ala Trp Val Asp Ser Gly Glu Thr Asn Ile Phe Gln Gly Thr Ile Pro			
50	35 40 45			

Trp Leu Tyr Ser Glu Gly Gly Ser Ala Thr Thr Asp Ala Asp Arg
 Val
 50 55 60
 5

Thr Leu Thr Ser Asp Leu Lys Gly Ala Arg Pro Gln Gly Met Lys
 Arg
 65 70 75 80
 10

Thr Ser Val Phe Thr Arg Val Ile Asn Ile Gly Asp Thr Glu Gly
 Asp
 85 90 95
 15

Val Asp Leu Gly Gly Leu Gly Asp Asn Ala Lys Thr Ile Asp Thr
 Ile
 100 105 110
 20

Arg Trp Met Ser Tyr Lys Asp Ala Gln Gly Gly Asp Pro Lys Glu
 Leu
 115 120 125
 25

Ala Thr Lys Val Thr Ser Tyr Thr Leu Thr Asp Ala Asp Arg Gly
 Arg
 130 135 140
 30

Tyr Ile Gly Ile Glu Ile Thr Pro Thr Thr Gln Thr Gly Thr Pro
 Asn
 145 150 155
 35 160

Val Gly Thr Ala Leu His Leu Tyr Asp Val Ser Thr Ala Ser Gly
 Gly
 165 170 175
 40

Gly Ser Asp Ser Asp Asn Val Ala Pro Gly Pro Val Val Asn Gln
 Asn
 180 185 190
 45

Leu Lys Val Ala Ile Phe Val Asp Gly Thr Ser Ile Asn Leu Ile
 Asn
 195 200 205
 50

Gly Ser Thr Pro Ile Glu Leu Gly Lys Thr Tyr Val Ala Lys Leu
 Tyr
 210 215 220
 5

Ser Asp Glu Asn Lys Asn Gly Lys Phe Asp Ala Gly Thr Asp Ala
 Asp
 225 230 235
 10 240

Val Thr Ala Asn Tyr Asp Phe Arg Trp Val Leu Ser Gly Ser Ser
 Gln
 245 250 255
 15

Gln Leu Gly Thr Ser Gly Gly Ile Val Asn Ser Ser Phe Asp Asn
 Asn
 260 265 270
 20

Asn Leu Val Ile Pro Ala Thr Asn Asp Glu Ala Arg Thr Asn Leu
 Asn
 275 280 285
 25

Gly Pro Ala Arg Asp Gly Lys Glu Ala Leu Ser Ile Pro Thr Asn
 Gly
 290 295 300
 30

Asp Gly Val Gln Gly Tyr Lys Leu His Ile Ile Tyr Lys His Lys
 305 310 315
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Met Lys Lys Val Leu Thr Leu Ser Leu Leu Ala Leu Cys Val Ser
 His
 1 5 10 15
 40

Ser Ala Val Ala Ala Asn Tyr Thr Phe Asn Asn Asp Asn Ile Ala
 Leu
 20 25 30
 45

Ser Phe Asp Asp Thr Asn Ser Thr Ile Val Leu Lys Asp Arg Arg
 Thr
 50

	35	40	45
5	Asn His Pro Ile Thr Pro Gln Glu Leu Phe Phe Leu Thr Leu Pro Asp	55	60
	50		
10	Glu Thr Lys Ile His Thr Ala Asp Phe Lys Ile Lys His Ile Lys Lys	70	75 80
	65		
15	Gln Asp Asn Ala Ile Val Ile Asp Phe Thr Arg Pro Asp Phe Asn Val	85	90 95
20	Thr Val Gln Leu Asn Leu Val Lys Gly Lys Tyr Ala Ser Ile Asp Tyr	100	105 110
25	Thr Ile Ala Ala Val Gly Gln Pro Arg Asp Val Ala Lys Ile Thr Phe	115	120 125
30	Phe Pro Thr Lys Lys Gln Phe Gln Ala Pro Tyr Val Asp Gly Ala Ile	130	135 140
35	Thr Ser Ser Pro Ile Ile Ala Asp Ser Phe Phe Ile Leu Pro Asn Lys	145	150 155
	160		
40	Pro Ile Val Asn Thr Tyr Ala Tyr Glu Ala Thr Thr Asn Leu Asn Val	165	170 175
45	Glu Leu Lys Thr Pro Ile Gln Pro Glu Thr Pro Val Ser Phe Thr Thr	180	185 190
50	Trp Phe Gly Thr Phe Pro Glu Thr Ser Gln Leu Arg Arg Ser Val Asn		

	195	200	205
5	Gln Phe Ile Asn Ala Val Arg Pro Arg Pro Tyr Lys Pro Tyr Leu His 210	215	220
10	Tyr Asn Ser Trp Met Asp Ile Gly Phe Phe Thr Pro Tyr Thr Glu Gln 225 240	230	235
15	Asp Val Leu Gly Arg Met Asp Glu Trp Asn Lys Glu Phe Ile Ser Gly 245	250	255
20	Arg Gly Val Ala Leu Asp Ala Phe Leu Leu Asp Asp Gly Trp Asp Asp 260	265	270
25	Leu Thr Gly Arg Trp Leu Phe Gly Pro Ala Phe Ser Asn Gly Phe Ser 275	280	285
30	Lys Val Arg Glu Lys Ala Asp Ser Leu His Ser Ser Val Gly Leu Trp 290	295	300
35	Leu Ser Pro Trp Gly Gly Tyr Asn Lys Pro Gln Arg Arg Ser Arg Phe 305 320	310	315
40	Ala Cys Lys Arg Val Trp Val Arg Asn Arg Gly Arg Gln Ala Gly Ala 325	330	335
45	Phe Gly Ser Glu Leu Leu Lys Asn Phe Asn Glu Gln Ile Ile Asn Leu 340	345	350
50			

	Ile	Lys	Asn	Glu	His	Ile	Thr	Ser	Phe	Lys	Leu	Asp	Gly	Met	Gly
	Asn														
			355					360					365		
5	Ala	Ser	Ser	His	Ile	Lys	Gly	Ser	Pro	Phe	Ala	Ser	Asp	Phe	Asp
	Ala														
			370				375					380			
10	Ser	Ile	Ala	Leu	Leu	His	Asn	Met	Arg	Arg	Ala	Asn	Pro	Asn	Leu
	Phe														
	385					390						395			
	400														
15	Ile	Asn	Leu	Thr	Thr	Gly	Thr	Asn	Ala	Ser	Pro	Ser	Trp	Leu	Phe
	Tyr														
					405					410					415
20	Ala	Asp	Ser	Ile	Trp	Arg	Gln	Gly	Asp	Asp	Ile	Asn	Leu	Tyr	Gly
	Pro														
				420					425					430	
25	Gly	Thr	Pro	Val	Gln	Gln	Trp	Ile	Thr	Tyr	Arg	Asp	Ala	Glu	Thr
	Tyr														
			435					440					445		
30	Arg	Ser	Ile	Val	Arg	Lys	Gly	Pro	Leu	Phe	Pro	Leu	Asn	Ser	Leu
	Met														
		450					455					460			
35	Tyr	His	Gly	Ile	Val	Ser	Ala	Glu	Asn	Ala	Tyr	Tyr	Gly	Leu	Glu
	Lys														
	465					470					475				
40	480														
	Val	Gln	Thr	Asp	Ser	Asp	Phe	Ala	Asp	Gln	Val	Trp	Ser	Tyr	Phe
	Ala														
45					485					490				495	
	Thr	Gly	Thr	Gln	Leu	Gln	Glu	Leu	Tyr	Ile	Thr	Pro	Ser	Met	Leu
	Asn														
50				500				505						510	

Lys Val Lys Trp Asp Thr Leu Ala Lys Ala Ala Lys Trp Ser Lys
 Glu
 515 520 525
 5

Asn Ala Ser Val Leu Val Asp Thr His Trp Ile Gly Gly Asp Pro
 Thr
 530 535 540
 10

Ala Leu Ala Val Tyr Gly Trp Ala Ser Trp Ser Lys Asp Lys Ala
 Ile
 545 550 555
 15 560

Leu Gly Leu Arg Asn Pro Ser Asp Lys Pro Gln Thr Tyr Tyr Leu
 Asp
 565 570 575
 20

Leu Ala Lys Asp Phe Glu Ile Pro Ala Gly Asn Ala Ala Gln Phe
 Ser
 580 585 590
 25

Leu Lys Ala Val Tyr Gly Ser Asn Lys Thr Val Pro Val Glu Tyr
 Lys
 595 600 605
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Asn Ala Thr Val Ile Thr Leu Gln Pro Leu Glu Thr Leu Val Phe
 Glu
 610 615 620
 35

Ala Val Thr Ile Asn
 625
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Met Asn Lys Ile Phe Lys Val Ile Trp Asn Pro Ala Thr Gly Ser
 Tyr
 1 5 10 15
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Thr Val Ala Ser Glu Thr Ala Lys Ser Arg Gly Lys Lys Ser Gly
 Arg
 50

	20	25	30
5	Ser Lys Leu Leu Ile Ser Ala Leu Val Ala Gly Gly Leu Leu Ser Ser	35	40
10	Phe Gly Ala Ser Ala Asp Asn Tyr Thr Gly Gln Pro Thr Asp Tyr Gly	50	55
15	Asp Gly Ser Ala Gly Asp Gly Trp Val Ala Ile Gly Lys Gly Ala Lys	65	70
20	Ala Asn Thr Phe Met Asn Thr Ser Gly Ala Ser Thr Ala Leu Gly Tyr	85	90
25	Asp Ala Ile Ala Glu Gly Glu Tyr Ser Ser Ala Ile Gly Ser Lys Thr	100	105
30	Leu Ala Thr Gly Gly Ala Ser Met Ala Phe Gly Val Ser Ala Lys Ala	115	120
35	Met Gly Asp Arg Ser Val Ala Leu Gly Ala Ser Ser Val Ala Asn Gly	130	135
40	Asp Arg Ser Met Ala Phe Gly Arg Tyr Ala Lys Thr Asn Gly Phe Thr	145	150
45	Ser Leu Ala Ile Gly Asp Ser Ser Leu Ala Asp Gly Glu Lys Thr Ile	165	170
50	Ala Leu Gly Asn Thr Ala Lys Ala Tyr Glu Ile Met Ser Ile Ala Leu		175

	180	185	190
5	Gly Asp Asn Ala Asn Ala Ser Lys Glu Tyr Ala Met Ala Leu Gly Ala		
	195	200	205
10	Ser Ser Lys Ala Gly Gly Ala Asp Ser Leu Ala Phe Gly Arg Lys Ser		
	210	215	220
15	Thr Ala Asn Ser Thr Gly Ser Leu Ala Ile Gly Ala Asp Ser Ser Ser		
	225	230	235
	240		
20	Ser Asn Asp Asn Ala Ile Ala Ile Gly Asn Lys Thr Gln Ala Leu Gly		
	245	250	255
25	Val Asn Ser Met Ala Leu Gly Asn Ala Ser Gln Ala Ser Gly Glu Ser		
	260	265	270
30	Ser Ile Ala Leu Gly Asn Thr Ser Glu Ala Ser Glu Gln Asn Ala Ile		
	275	280	285
35	Ala Leu Gly Gln Gly Ser Ile Ala Ser Lys Val Asn Ser Ile Ala Leu		
	290	295	300
40	Gly Ser Asn Ser Leu Ser Ser Gly Glu Asn Ala Ile Ala Leu Gly Glu		
	305	310	315
	320		
45	Gly Ser Ala Ala Gly Gly Ser Asn Ser Leu Ala Phe Gly Ser Gln Ser		
	325	330	335
50			

Arg Ala Asn Gly Asn Asp Ser Val Ala Ile Gly Val Gly Ala Ala
 Ala
 340 345 350

5
 Ala Thr Asp Asn Ser Val Ala Ile Gly Ala Gly Ser Thr Thr Asp
 Ala
 355 360 365

10
 Ser Asn Thr Val Ser Val Gly Asn Ser Ala Thr Lys Arg Lys Ile
 Val
 370 375 380

15
 Asn Met Ala Ala Gly Ala Ile Ser Asn Thr Ser Thr Asp Ala Ile
 Asn
 385 390 395
 400

20
 Gly Ser Gln Leu Tyr Thr Ile Ser Asp Ser Val Ala Lys Arg Leu
 Gly
 405 410 415

25
 Gly Gly Ala Thr Val Gly Ser Asp Gly Thr Val Thr Ala Val Ser
 Tyr
 420 425 430

30
 Ala Leu Arg Ser Gly Thr Tyr Asn Asn Val Gly Asp Ala Leu Ser
 Gly
 435 440 445

35
 Ile Asp Asn Asn Thr Leu Gln Trp Asn Lys Thr Ala Gly Ala Phe
 Ser
 450 455 460

40
 Ala Asn His Gly Ala Asn Ala Thr Asn Lys Ile Thr Asn Val Ala
 Lys
 465 470 475
 480

45
 Gly Thr Val Ser Ala Thr Ser Thr Asp Val Val Asn Gly Ser Gln
 Leu
 485 490 495

50

	Tyr Asp Leu Gln Gln Asp Ala Leu Leu Trp Asn Gly Thr Ala Phe Ser			
5		500	505	510
	Ala Ala His Gly Thr Glu Ala Thr Ser Lys Ile Thr Asn Val Thr Ala			
10		515	520	525
	Gly Asn Leu Thr Ala Gly Ser Thr Asp Ala Val Asn Gly Ser Gln Leu			
15		530	535	540
	Lys Thr Thr Asn Asp Asn Val Thr Thr Asn Thr Thr Asn Ile Ala Thr			
20		545	550	555
		560		
	Asn Thr Thr Asn Ile Thr Asn Leu Thr Asp Ala Val Asn Gly Leu Gly			
25		565	570	575
	Asp Asp Ser Leu Leu Trp Asn Lys Ala Ala Gly Ala Phe Ser Ala Ala			
30		580	585	590
	His Gly Thr Glu Ala Thr Ser Lys Ile Thr Asn Val Thr Ala Gly Asn			
35		595	600	605
	Leu Thr Ala Gly Ser Thr Asp Ala Val Asn Gly Ser Gln Leu Lys Thr			
40		610	615	620
	Thr Asn Asp Asn Val Thr Thr Asn Thr Thr Asn Ile Ala Thr Asn Thr			
45		625	630	635
		640		
	Thr Asn Ile Thr Asn Leu Thr Asp Ala Val Asn Gly Leu Gly Asp Asp			
50		645	650	655

5	Ser Leu Leu Trp Asn Lys Thr Ala Gly Ala Phe Ser Ala Ala His Gly	660	665	670
10	Thr Asp Ala Thr Ser Lys Ile Thr Asn Val Thr Ala Gly Asn Leu Thr	675	680	685
15	Ala Gly Ser Thr Asp Ala Val Asn Gly Ser Gln Leu Lys Thr Thr Asn	690	695	700
20	Asp Asn Val Thr Thr Asn Thr Thr Asn Ile Ala Thr Asn Thr Thr Asn	705	710	715
		720		
25	Ile Thr Asn Leu Thr Asp Ala Val Asn Gly Leu Gly Asp Asp Ser Leu	725	730	735
30	Leu Trp Asn Lys Thr Ala Gly Ala Phe Ser Ala Ala His Gly Thr Asp	740	745	750
35	Ala Thr Ser Lys Ile Thr Asn Val Lys Ala Gly Asp Leu Thr Ala Gly	755	760	765
40	Ser Thr Asp Ala Val Asn Gly Ser Gln Leu Lys Thr Thr Asn Asp Asn	770	775	780
45	Val Ser Thr Asn Thr Thr Asn Ile Thr Asn Leu Thr Asp Ala Val Asn	785	790	795
		800		
50	Gly Leu Gly Asp Asp Ser Leu Leu Trp Asn Lys Thr Ala Gly Ala Phe			

		805		810		815
5	Ser Ala Ala His Gly Thr Asp Ala Thr Ser Lys Ile Thr Asn Val Lys	820		825		830
10	Ala Gly Asp Leu Thr Ala Gly Ser Thr Asp Ala Val Asn Gly Ser Gln	835		840		845
15	Leu Lys Thr Thr Asn Asp Asn Val Ser Thr Asn Thr Thr Asn Ile Thr	850		855		860
20	Asn Leu Thr Asp Ser Val Gly Asp Leu Lys Asp Asp Ser Leu Leu Trp	865		870		875
		880				
25	Asn Lys Ala Ala Gly Ala Phe Ser Ala Ala His Gly Thr Glu Ala Thr	885		890		895
30	Ser Lys Ile Thr Asn Leu Leu Ala Gly Lys Ile Ser Ser Asn Ser Thr	900		905		910
35	Asp Ala Ile Asn Gly Ser Gln Leu Tyr Gly Val Ala Asp Ser Phe Thr	915		920		925
40	Ser Tyr Leu Gly Gly Gly Ala Asp Ile Ser Asp Thr Gly Val Leu Ser	930		935		940
45	Gly Pro Thr Tyr Thr Ile Gly Gly Thr Asp Tyr Thr Asn Val Gly Asp	945		950		955
		960				

Ala Leu Ala Ala Ile Asn Thr Ser Phe Ser Thr Ser Leu Gly Asp
Ala

965

970

975

5

Leu Leu Trp Asp Ala Thr Ala Gly Lys Phe Ser Ala Lys His Gly
Ile

980

985

990

10

Asn Asn Ala Pro Ser Val Ile Thr Asp Val Ala Asn Gly Ala Val
Ser

995

1000

1005

15

Ser Thr Ser Ser Asp Ala Ile Asn Gly Ser Gln Leu Tyr Gly Val
1010 1015 1020

20

Ser Asp Tyr Ile Ala Asp Ala Leu Gly Gly Asn Ala Val Val Asn
1025 1030 1035

25

Thr Asp Gly Ser Ile Thr Thr Pro Thr Tyr Ala Ile Ala Gly Gly
1040 1045 1050

30

Ser Tyr Asn Asn Val Gly Asp Ala Leu Glu Ala Ile Asp Thr Thr
1055 1060 1065

Leu Asp Asp Ala Leu Leu Trp Asp Thr Thr Ala Asn Gly Gly Asn
1070 1075 1080

35

Gly Ala Phe Ser Ala Ala His Gly Lys Asp Lys Thr Ala Ser Val
1085 1090 1095

40

Ile Thr Asn Val Ala Asn Gly Ala Val Ser Ala Thr Ser Asn Asp
1100 1105 1110

45

Ala Ile Asn Gly Ser Gln Leu Tyr Ser Thr Asn Lys Tyr Ile Ala
1115 1120 1125

Asp Ala Leu Gly Gly Asp Ala Glu Val Asn Ala Asp Gly Thr Ile
1130 1135 1140

50

	Thr	Ala	Pro	Thr	Tyr	Thr	Ile	Ala	Asn	Thr	Asp	Tyr	Asn	Asn	Val
	1145						1150					1155			
5	Gly	Glu	Ala	Leu	Asp	Ala	Leu	Asp	Asn	Asn	Ala	Leu	Leu	Trp	Asp
	1160						1165					1170			
10	Glu	Asp	Ala	Gly	Ala	Tyr	Asn	Ala	Ser	His	Asp	Gly	Asn	Ala	Ser
	1175						1180					1185			
15	Lys	Ile	Thr	Asn	Val	Ala	Ala	Gly	Asp	Leu	Ser	Thr	Thr	Ser	Thr
	1190						1195					1200			
20	Asp	Ala	Val	Asn	Gly	Ser	Gln	Leu	Asn	Ala	Thr	Asn	Ile	Leu	Val
	1205						1210					1215			
25	Thr	Gln	Asn	Ser	Gln	Met	Ile	Asn	Gln	Leu	Ala	Gly	Asn	Thr	Ser
	1220						1225					1230			
30	Glu	Thr	Tyr	Ile	Glu	Glu	Asn	Gly	Ala	Gly	Ile	Asn	Tyr	Val	Arg
	1235						1240					1245			
35	Thr	Asn	Asp	Ser	Gly	Leu	Ala	Phe	Asn	Asp	Ala	Ser	Ala	Ser	Gly
	1250						1255					1260			
40	Ile	Gly	Ala	Thr	Ala	Val	Gly	Tyr	Asn	Ala	Val	Ala	Ser	His	Ala
	1265						1270					1275			
45	Ser	Ser	Val	Ala	Ile	Gly	Gln	Asp	Ser	Ile	Ser	Glu	Val	Asp	Thr
	1280						1285					1290			
50	Gly	Ile	Ala	Leu	Gly	Ser	Ser	Ser	Val	Ser	Ser	Arg	Val	Ile	Val
	1295						1300					1305			
55	Lys	Gly	Thr	Arg	Asn	Thr	Ser	Val	Ser	Glu	Glu	Gly	Val	Val	Ile
	1310						1315					1320			
60	Gly	Tyr	Asp	Thr	Thr	Asp	Gly	Glu	Leu	Leu	Gly	Ala	Leu	Ser	Ile
	1325						1330					1335			

	Gly	Asp	Asp	Gly	Lys	Tyr	Arg	Gln	Ile	Ile	Asn	Val	Ala	Asp	Gly
	1340						1345					1350			
5	Ser	Glu	Ala	His	Asp	Ala	Val	Thr	Val	Arg	Gln	Leu	Gln	Asn	Ala
	1355						1360					1365			
10	Ile	Gly	Ala	Val	Ala	Thr	Thr	Pro	Thr	Lys	Tyr	Tyr	His	Ala	Asn
	1370						1375					1380			
15	Ser	Thr	Ala	Glu	Asp	Ser	Leu	Ala	Val	Gly	Glu	Asp	Ser	Leu	Ala
	1385						1390					1395			
20	Met	Gly	Ala	Lys	Thr	Ile	Val	Asn	Gly	Asn	Ala	Gly	Ile	Gly	Ile
	1400						1405					1410			
	Gly	Leu	Asn	Thr	Leu	Val	Leu	Ala	Asp	Ala	Ile	Asn	Gly	Ile	Ala
	1415						1420					1425			
25	Ile	Gly	Ser	Asn	Ala	Arg	Ala	Asn	His	Ala	Asp	Ser	Ile	Ala	Met
	1430						1435					1440			
30	Gly	Asn	Gly	Ser	Gln	Thr	Thr	Arg	Gly	Ala	Gln	Thr	Asn	Tyr	Thr
	1445						1450					1455			
35	Ala	Tyr	Asn	Met	Asp	Ala	Pro	Gln	Asn	Ser	Val	Gly	Glu	Phe	Ser
	1460						1465					1470			
40	Val	Gly	Ser	Glu	Asp	Gly	Gln	Arg	Gln	Ile	Thr	Asn	Val	Ala	Ala
	1475						1480					1485			
	Gly	Ser	Ala	Asp	Thr	Asp	Ala	Val	Asn	Val	Gly	Gln	Leu	Lys	Val
	1490						1495					1500			
45	Thr	Asp	Ala	Gln	Val	Ser	Gln	Asn	Thr	Gln	Ser	Ile	Thr	Asn	Leu
	1505						1510					1515			
50	Asn	Thr	Gln	Val	Thr	Asn	Leu	Asp	Thr	Arg	Val	Thr	Asn	Ile	Glu
	1520						1525					1530			

5 Asn Gly Ile Gly Asp Ile Val Thr Thr Gly Ser Thr Lys Tyr Phe
 1535 1540 1545
 Lys Thr Asn Thr Asp Gly Ala Asp Ala Asn Ala Gln Gly Lys Asp
 1550 1555 1560
 10 Ser Val Ala Ile Gly Ser Gly Ser Ile Ala Ala Ala Asp Asn Ser
 1565 1570 1575
 15 Val Ala Leu Gly Thr Gly Ser Val Ala Asp Glu Glu Asn Thr Ile
 1580 1585 1590
 20 Ser Val Gly Ser Ser Thr Asn Gln Arg Arg Ile Thr Asn Val Ala
 1595 1600 1605
 25 Ala Gly Val Asn Ala Thr Asp Ala Val Asn Val Ser Gln Leu Lys
 1610 1615 1620
 Ser Ser Glu Ala Gly Gly Val Arg Tyr Asp Thr Lys Ala Asp Gly
 1625 1630 1635
 30 Ser Ile Asp Tyr Ser Asn Ile Thr Leu Gly Gly Gly Asn Ser Gly
 1640 1645 1650
 35 Thr Thr Arg Ile Ser Asn Val Ser Ala Gly Val Asn Asn Asn Asp
 1655 1660 1665
 40 Ala Val Asn Tyr Ala Gln Leu Lys Gln Ser Val Gln Glu Thr Lys
 1670 1675 1680
 45 Gln Tyr Thr Asp Gln Arg Met Val Glu Met Asp Asn Lys Leu Ser
 1685 1690 1695
 Lys Thr Glu Ser Lys Leu Ser Gly Gly Ile Ala Ser Ala Met Ala
 1700 1705 1710
 50 Met Thr Gly Leu Pro Gln Ala Tyr Thr Pro Gly Ala Ser Met Ala

	1715		1720		1725
5	Ser Ile Gly Gly Gly Thr Tyr Asn Gly Glu Ser Ala Val Ala Leu 1730 1735 1740				
10	Gly Val Ser Met Val Ser Ala Asn Gly Arg Trp Val Tyr Lys Leu 1745 1750 1755				
15	Gln Gly Ser Thr Asn Ser Gln Gly Glu Tyr Ser Ala Ala Leu Gly 1760 1765 1770				
	Ala Gly Ile Gln Trp 1775				
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25	Met Asn Leu Lys Lys Thr Leu Leu Ser Val Leu Met Ile Leu Gln Leu 1 5 10 15				
30	Cys Leu Leu Val Gly Cys Asp Tyr Ile Glu Lys Ala Ser Lys Val Asp 20 25 30				
35	Asp Leu Val Thr Gln Gln Glu Leu Gln Lys Ser Lys Ile Glu Ala Leu 35 40 45				
40	Glu Lys Gln Gln Glu Leu Asp Lys Arg Lys Ile Glu His Phe Glu Lys 50 55 60				
45	Gln Gln Thr Thr Ile Ile Asn Ser Thr Lys Thr Leu Ala Gly Val Val 65 70 75 80				
50	Lys Ala Val Lys Asn Lys Gln Asp Glu Phe Val Phe Thr Glu Phe Asn 85 90 95				

Pro Ala Gln Thr Gln Tyr Phe Ile Leu Asn Asn Gly Ser Val Gly
 Leu
 100 105 110
 5

Ala Gly Lys Ile Leu Ser Ile Asp Ala Val Glu Asn Gly Ser Val
 Ile
 115 120 125
 10

Arg Ile Ser Leu Val Asn Leu Leu Ser Val Pro Val Ser Asn Met
 Gly
 130 135 140
 15

Phe Tyr Ala Thr Trp Gly Gly Glu Lys Pro Thr Asp Ile Asn Ala
 Leu
 145 150 155
 20

Ala Lys Trp Gln Gln Leu Leu Phe Ser Thr Ala Met Ash Ser Ser
 Leu
 165 170 175
 25

Lys Leu Leu Pro Gly Gln Trp Gln Asp Ile Asn Leu Thr Leu Lys
 Gly
 180 185 190
 30

Val Ser Pro Asn Asn Leu Lys Tyr Leu Lys Leu Ala Ile Asn Met
 Ala
 195 200 205
 35

Asn Ile Gln Phe Asp Arg Leu Gln Pro Ala Glu Ser Pro Gln Arg
 Lys
 210 215 220
 40

Asn Lys Lys
 225
 45

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Met Lys Arg Val Val Arg Leu Leu Gly Val Gly Leu Leu Leu Leu
 Val
 50

```

1           5           10           15
5 Val Leu Leu Leu Ile Leu Phe Val Leu Ala Gln Thr Thr Pro Leu
  Ile
      20           25           30
10 Ser Ala Gln Asp Glu His Ala Val Trp Leu Arg Leu Leu Ile Thr
   Ala
      35           40           45
15 Ile Val Ile Cys Leu Leu Ser Met Cys Ile Phe Phe Leu Phe Ser
   Phe
      50           55           60
20 Arg Gln Asn Glu Ala Ser Thr Ile Ser Leu Tyr Ala Gln Pro Thr
   Asp
      65           70           75           80
25 Ile Lys Glu Ile Asn Thr Glu Gln Pro Asn Tyr Ala Ser Leu Leu
   Thr
      85           90           95
30 Ile Tyr Leu Arg Asp Arg Tyr Gly Pro Phe Trp Arg Arg Lys Val
   Arg
      100           105           110
35 Leu Leu Leu Val Thr Gly Glu Pro Glu Gln Ala Glu Ala Ile Ala
   Pro
      115           120           125
40 Gly Leu Thr Gly Gln His Trp Leu Glu Gly Asp His Thr Val Leu
   Ile
      130           135           140
45 Tyr Gly Gly Arg Pro Thr Ala Glu Pro Asp Val Thr Leu Leu Thr
   Ala
      145           150           155
50 Leu Lys Lys Leu Arg Arg Ser Arg Pro Leu Asp Gly Ile Ile Trp
   Ala

```


		165		170		175
5	Leu Thr Glu Glu Gln Ser Arg Gln Thr Ala Gln Leu Asp Lys Gly Trp	180	185	190		
10	Arg Gly Leu Ile Asn Gly Gly Lys Arg Leu Gly Phe Gln Ala Pro Leu	195	200	205		
15	Tyr Leu Trp Gln Val Cys Asp Asp Gly Asp Tyr Gln Thr Gly Arg Pro	210	215	220		
20	Leu Gln Ser Val Gly Cys Leu Leu Pro Glu Arg Cys Thr Pro Glu Gln 225 240	230	235			
25	Leu Ala Val Met Leu Glu Ala Ala Ala Asp Gly Thr Gly His Val Ala	245	250	255		
30	Ala Thr Asp Arg Tyr Arg Met Phe Ser Ala Ala Ser Gly Ser Tyr Pro	260	265	270		
35	Cys Arg Ala Gly Tyr Cys Ser Leu Ala Asp Arg Pro Glu Thr Ala Ala	275	280	285		
40	Gly Arg Arg Arg Ile Phe Phe Pro Ala Pro Ala Arg Pro Asp Val Gln	290	295	300		
45	Pro Ala Ala Cys Arg Arg Ala Gly Gly Gln His Leu Met Gln Trp Leu 305 320	310	315			
50						

[illegible]

[illegible]

5	Thr Ser Ala Asp Ile Ser Pro Asp Thr Leu Arg Asn Arg Leu Thr Ser	645	650	655
10	Arg Tyr Phe Thr Asp Phe Ala Gly Ser Trp Leu Ala Phe Leu Asn Ser	660	665	670
15	Ile His Trp Lys Lys Glu Asp Ser Leu Ser Gly Ile Leu Asp Gln Leu	675	680	685
20	Thr Leu Met Ala Asp Ala Arg Gln Ser Pro Leu Ile Ala Leu Thr Asp	690	695	700
25	Thr Leu Ala Trp Gln Ala Ala Thr Gly Arg Glu Asn Arg Gly Leu Ser	705	710	715
		720		
30	Asp Ser Leu Ala Lys Ser Ala Gln Glu Leu Phe Asn Gly Lys Glu Lys	725	730	735
35	Thr Pro Gln Gln Ser Arg Glu Gly Asp Asp Val Pro Val Gly Pro Leu	740	745	750
40	Asp Lys Thr Phe Thr Pro Leu Leu Arg Leu Leu Gly Asp Lys Ala Gly	755	760	765
45	Gly Gly Asp Ser Gln Leu Ser Leu Gln Thr Tyr Leu Thr Arg Val Thr	770	775	780
50	Arg Val Arg Leu Lys Leu Gln Gln Val Thr Asn Ala Pro Asp Pro Gln			

	785		790		795
	800				
5	Glu Met Thr Gln Gln Leu Ala Gln Thr Val Leu Gln Gly Lys Thr				
	Val				
		805		810	815
10	Asp Leu Thr Asp Thr Arg Asp Tyr Gly Arg Leu Ile Ala Ala Ser				
	Leu				
		820		825	830
15	Gly Glu Glu Trp Ser Gly Phe Gly Gln Ala Leu Phe Val Arg Pro				
	Val				
		835		840	845
20	Glu Gln Ser Trp Arg Gln Val Leu Thr Pro Ala Ala Asp Ser Leu				
	Asn				
		850		855	860
25	Arg Gln Trp Gln Arg Ala Ile Val Ser His Trp Asn Gln Asp Phe				
	Ala				
	865		870		875
	880				
30	Gly Arg Tyr Pro Phe Lys Ala Ser Gln Asn Asp Ala Ser Leu Pro				
	Leu				
		885		890	895
35	Leu Ala Gln Tyr Leu Arg Asp Asp Gly Arg Ile Asn Leu Phe Ile				
	Ala				
		900		905	910
40	Ala Asn Leu Ser Gly Val Leu Lys Arg Glu Gly Arg Tyr Trp Val				
	Ala				
		915		920	925
45	Asp Ala Met Asn Thr Gln Gly Leu Thr Val Asn Pro Asp Phe Ile				
	Arg				
		930		935	940
50					

Ala Leu Asn Arg Leu Arg Asp Val Ala Asp Thr Ala Phe Ala Ser
 Gly
 945 950 955
 960
 5

Asp Ala Gly Ile His Phe Glu Leu Arg Ala Lys Pro Ala Arg Asp
 Val
 965 970 975
 10

Met Lys Thr His Leu Val Ile Asp Gly Gln Glu Leu Glu Tyr Phe
 Asn
 980 985 990
 15

Gln Lys Glu Arg Trp Gln Arg Phe Asn Trp Pro Asp Glu Gln Trp
 Gln
 995 1000 1005
 20

Pro Gly Ala Ser Leu Ser Trp Thr Ser Thr Gln Ala Met Glu Arg
 1010 1015 1020
 25

Ile Leu Ala Asp Tyr Arg Gly Ser Trp Ser Leu Ile Arg Leu Leu
 1025 1030 1035
 30

Glu Gln Ala Gln Val Thr Pro Val Asp Ser Ser Thr Phe Lys Val
 1040 1045 1050
 35

Val Trp Lys Ala Gln Asp Gly Leu Pro Leu Asn Tyr Leu Leu Arg
 1055 1060 1065
 40

Val Glu Gln Gly Lys Gly Pro Leu Ala Leu Leu Glu Leu Lys Asn
 1070 1075 1080
 45

Phe Arg Leu Pro Gly Gln Val Phe Leu Thr Gly Lys Ser Met Lys
 1085 1090 1095
 50

Asp Val Glu Glu Tyr Gly Glu Asp Ala Asp Glu
 1100 1105

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Arg Ser Ile Glu Leu Met Arg Ser Asp Leu Arg Leu Leu Pro Leu
 Lys
 165 170 175
 5
 Asp Lys
 10
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 38
 Met Ile Ser Gly Gly Asn Met Leu Lys Glu Trp Met Ile Phe Thr
 15 Cys
 1 5 10 15
 Ser Leu Leu Thr Leu Ala Gly Ala Ser Leu Pro Leu Ser Gly Cys
 20 Ile
 20 25 30
 Ser Arg Gly Gln Glu Ser Ile Ser Glu Gly Ala Ala Phe Gly Ala
 25 Gly
 35 40 45
 Ile Leu Arg Glu Pro Gly Ala Thr Lys Lys Ala Asp Thr Lys Asp
 30 Leu
 50 55 60
 Asn Val Pro Pro Pro Val Tyr Gly Pro Pro Gln Val Ile Phe Arg
 35 Ile
 65 70 75 80
 Asp Asp Asn Arg Tyr Phe Thr Leu Glu Asn Tyr Thr His Cys Glu
 40 Asn
 85 90 95
 Gly Gln Thr Phe Tyr Asn Asn Lys Ala Lys Asn Ile His Val Lys
 45 Ile
 100 105 110
 Leu Asp Ala Ser Gly Tyr Leu Phe Lys Gly Arg Leu Phe Trp Leu
 50 Ser
 115 120 125

	Thr	Arg	Asp	Asp	Phe	Leu	Ala	Phe	Pro	Ala	Thr	Leu	Asn	Thr	Arg
5	His														
		130					135					140			
	Ala	Ser	Cys	Met	Gly	Ser	Asn	Lys	Gly	Cys	Met	Asn	Ala	Val	Ile
10	Val														
	145					150					155				
	160														
	Thr	Thr	Asp	Gly	Gly	Lys	Arg	Arg	Ser	Gly	Val	Pro	Tyr	Gly	Ser
15	Tyr														
					165					170				175	
	Thr	Gln	Asn	Pro	Thr	Gly	Ala	Thr	Arg	Asp	Tyr	Asp	Met	Leu	Val
20	Met														
				180					185					190	
	Asn	Asp	Gly	Phe	Tyr	Leu	Leu	Arg	Tyr	Arg	Gly	Gly	Gln	Gly	Arg
25	Phe														
			195					200					205		
	Ser	Pro	Val	Ile	Leu	Arg	Trp	Ile	Leu	Ser	Thr	Glu	Asp	Ser	Ser
30	Gly														
		210					215					220			
	Val	Val	Arg	Ser	Glu	Asp	Ala	Tyr	Glu	Leu	Phe	Arg	Pro	Gly	Glu
35	Glu														
	225					230					235				
	240														
	Val	Pro	Ser	Thr	Gly	Phe	Tyr	Lys	Ile	Asp	Leu	Ser	Arg	Phe	Tyr
40	Pro														
					245					250				255	
	Lys	Asn	Asn	Val	Met	Glu	Met	Gln	Cys	Asp	Arg	Thr	Leu	Glu	Pro
45	Val														
				260				265					270		
	Gln	Pro	Ser	Glu	Ser	Lys	Ile	Gln							
50															
			275					280							

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5

Met Glu His Val Ser Ile Lys Thr Leu Tyr His Leu Leu Cys Cys
Met
1 5 10 15

10

Leu Leu Phe Ile Ser Ala Met Cys Ala Leu Ala Gln Glu His Glu
Pro
20 25 30

15

Ile Gly Ala Gln Asp Glu Arg Leu Ser Thr Leu Ile His Gln Arg
Met
35 40 45

20

Gln Glu Ala Lys Val Pro Ala Leu Ser Val Ser Val Thr Ile Lys
Gly
50 55 60

25

Val Arg Gln Arg Phe Val Tyr Gly Val Ala Asp Val Ala Ser Gln
Lys
65 70 75 80

30

Ala Asn Thr Leu Asp Thr Val Tyr Glu Leu Gly Ser Met Ser Lys
Ala
85 90 95

35

Phe Thr Gly Leu Val Val Gln Ile Leu Ile Gln Glu Gly Arg Leu
Arg
100 105 110

40

Gln Gly Asp Asp Ile Ile Thr Tyr Leu Pro Glu Met Arg Leu Asn
Tyr
115 120 125

45

Gln Gly Lys Pro Ala Ser Leu Thr Val Ala Asp Phe Leu Tyr His
Thr
130 135 140

50

Ser Gly Leu Pro Phe Ser Thr Leu Ala Arg Leu Glu Asn Pro Met
 Pro
 145 150 155
 160
 5

Gly Ser Ala Val Ala Gln Gln Leu Arg Asn Glu Asn Leu Leu Phe
 Ala
 165 170 175
 10

Pro Gly Ala Lys Phe Ser Tyr Ala Ser Ala Asn Tyr Asp Val Leu
 Gly
 180 185 190
 15

Ala Val Ile Glu Asn Val Thr Gly Lys Thr Phe Thr Glu Val Ile
 Ala
 195 200 205
 20

Glu Arg Leu Thr Gln Pro Leu Gly Met Ser Ala Thr Val Ala Val
 Lys
 210 215 220
 25

Gly Asp Glu Ile Ile Val Asn Lys Ala Ser Gly Tyr Lys Leu Gly
 Phe
 225 230 235
 240
 30

Gly Lys Pro Val Leu Phe His Ala Pro Leu Ala Arg Asn His Val
 Pro
 245 250 255
 35

Ala Ala Tyr Ile His Ser Thr Leu Pro Asp Met Glu Ile Trp Ile
 Asp
 260 265 270
 40

Ala Trp Leu His Arg Lys Ala Leu Pro Ala Thr Leu Arg Glu Ala
 Met
 275 280 285
 45

Ser Asn Ser Trp Arg Gly Asn Ser Asp Val Pro Leu Ala Ala Asp
 Asn
 290 295 300
 50

	Arg	Ile	Leu	Tyr	Ala	Ser	Gly	Trp	Phe	Ile	Asp	Gln	Asn	Gln	Gly
	Pro														
	305						310					315			
5	320														
	Tyr	Ile	Ser	His	Gly	Gly	Gln	Asn	Pro	Asn	Phe	Ser	Ser	Cys	Ile
	Ala														
10					325					330					335
	Leu	Arg	Pro	Asp	Gln	Gln	Ile	Gly	Ile	Val	Ala	Leu	Ala	Asn	Met
	Asn														
15					340				345					350	
	Ser	Asn	Leu	Ile	Leu	Gln	Leu	Cys	Ala	Asp	Ile	Asp	Asn	Tyr	Leu
	Arg														
20			355					360					365		
	Ile	Gly	Lys	Tyr	Ala	Asp	Gly	Ala	Gly	Asp	Ala	Ile	Thr	Ala	Thr
	Asp														
25		370					375					380			
	Thr	Leu	Phe	Val	Tyr	Leu	Thr	Leu	Leu	Leu	Cys	Phe	Trp	Gly	Ala
	Val														
30	385					390					395				
	400														
	Val	Val	Val	Arg	Gly	Ala	Phe	Arg	Val	Tyr	Arg	Ala	Thr	Ala	His
	Gly														
35					405				410					415	
	Pro	Gly	Lys	Gln	Gln	Arg	Leu	Arg	Leu	Arg	Val	Arg	Asp	Tyr	Ile
	Ile														
40					420				425				430		
	Ala	Leu	Ala	Val	Pro	Gly	Leu	Val	Ala	Ala	Met	Leu	Tyr	Val	Ala
	Pro														
45					435				440				445		
	Gly	Ile	Leu	Ser	Pro	Gly	Leu	Asp	Trp	Arg	Phe	Ile	Leu	Val	Trp
	Gly														
50															
		450					455					460			

Pro Ser Ser Val Leu Ala Ile Pro Phe Gly Ile Ile Leu Leu Ala
 Phe
 5 465 470 475
 480

Val Leu Thr Leu Asn His Gln Ile Lys Arg Ile Leu Leu His Asn
 10 Lys
 485 490 495

Glu Trp Asp Asp Glu
 15 500

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20 Met Lys Asn Lys Tyr Ile Ile Ala Pro Gly Ile Ala Val Met Cys
 Ser
 1 5 10 15

25 Ala Val Ile Ser Ser Gly Tyr Ala Ser Ser Asp Lys Lys Glu Asp
 Thr
 20 25 30

30 Leu Val Val Thr Ala Ser Gly Phe Thr Gln Gln Leu Arg Asn Ala
 Pro
 35 40 45

35 Ala Ser Val Ser Val Ile Thr Ser Glu Gln Leu Gln Lys Lys Pro
 Val
 50 55 60

40 Ser Asp Leu Val Asp Ala Val Lys Asp Val Glu Gly Ile Ser Ile
 Thr
 65 70 75 80

45 Gly Gly Asn Glu Lys Pro Asp Ile Ser Ile Arg Gly Leu Ser Gly
 Asp
 85 90 95

50

130/370

Tyr Thr Leu Ile Leu Val Asp Gly Arg Arg Gln Ser Gly Arg Glu
 Ser
 100 105 110

5

Arg Pro Asn Gly Ser Gly Gly Phe Glu Ala Gly Phe Ile Pro Pro
 Val
 115 120 125

10

Glu Ala Ile Glu Arg Ile Glu Val Ile Arg Gly Pro Met Ser Ser
 Leu
 130 135 140

15

Tyr Gly Ser Asp Ala Ile Gly Gly Val Ile Asn Ile Ile Thr Lys
 Pro
 145 150 155
 160

20

Val Asn Asn Gln Thr Trp Asp Gly Val Leu Gly Leu Gly Gly Ile
 Ile
 165 170 175

25

Gln Glu His Gly Lys Phe Gly Asn Ser Thr Thr Asn Asp Phe Tyr
 Leu
 180 185 190

30

Ser Gly Pro Leu Ile Lys Asp Lys Leu Gly Leu Gln Leu Tyr Gly
 Gly
 195 200 205

35

Met Asn Tyr Arg Lys Glu Asp Ser Ile Ser Gln Gly Thr Pro Ala
 Lys
 210 215 220

40

Asp Asn Lys Asn Ile Thr Ala Thr Leu Gln Phe Thr Pro Thr Glu
 Ser
 225 230 235
 240

45

Gln Lys Phe Val Phe Glu Tyr Gly Lys Asn Asn Gln Val His Thr
 Leu
 245 250 255

50

5	Trp Asn Pro Arg Leu Tyr Ala Val Tyr Asn Leu Thr Asp Asn Leu Thr	420	425	430
10	Leu Lys Gly Gly Ile Ala Lys Ala Phe Arg Ala Pro Ser Ile Arg Glu	435	440	445
15	Val Ser Pro Gly Phe Gly Thr Leu Thr Gln Gly Gly Ala Ser Ile Met	450	455	460
20	Tyr Gly Asn Arg Asp Leu Lys Pro Glu Thr Ser Val Thr Glu Glu Ile	465	470	475
		480		
25	Gly Ile Ile Tyr Ser Asn Asp Ser Gly Phe Ser Ala Ser Ala Thr Leu	485	490	495
30	Phe Asn Thr Asp Phe Lys Asn Lys Leu Thr Ser Tyr Asp Ile Gly Thr	500	505	510
35	Lys Asp Pro Val Thr Gly Leu Asn Thr Phe Ile Tyr Asp Asn Val Gly	515	520	525
40	Glu Ala Asn Ile Arg Gly Val Glu Leu Ala Thr Gln Ile Pro Val Tyr	530	535	540
45	Asp Lys Trp His Val Ser Ala Asn Tyr Thr Phe Thr Asp Ser Arg Arg	545	550	555
		560		
50	Lys Ser Asp Asp Glu Ser Leu Asn Gly Lys Ser Leu Lys Gly Glu Pro			

					565					570					575
5	Leu	Glu	Arg	Thr	Pro	Arg	His	Ala	Ala	Asn	Ala	Lys	Leu	Glu	Trp
	Asp														
					580				585				590		
10	Tyr	Thr	Gln	Asp	Ile	Thr	Phe	Tyr	Ser	Ser	Leu	Asn	Tyr	Thr	Gly
	Lys														
					595			600				605			
15	Gln	Ile	Trp	Ala	Ala	Gln	Arg	Asn	Gly	Ala	Lys	Val	Pro	Arg	Val
	Arg														
		610					615					620			
20	Asn	Gly	Phe	Thr	Ser	Met	Asp	Ile	Gly	Leu	Asn	Tyr	Gln	Ile	Leu
	Pro														
	625					630					635				
	640														
25	Asp	Thr	Leu	Ile	Asn	Phe	Ala	Val	Leu	Asn	Val	Thr	Asp	Arg	Lys
	Ser														
					645				650				655		
30	Glu	Asp	Ile	Asp	Thr	Ile	Asp	Gly	Asn	Trp	Gln	Val	Asp	Glu	Gly
	Arg														
					660				665				670		
35	Arg	Tyr	Trp	Ala	Asn	Val	Arg	Val	Ser	Phe					
					675			680							
40	<210>	41	<211>	164	<212>	PRT	<213>	Escherichia coli	<400>						
	41														
45	Met	Gly	Phe	Arg	Lys	Thr	Ile	Ile	Thr	Ser	Val	Gly	Leu	Ile	Phe
	Ile														
	1				5				10				15		
50	Ser	Phe	Ser	Phe	Val	Ala	Lys	Cys	Ser	Gln	Leu	Lys	Asn	Leu	Asn
	Asn														
					20				25				30		

Tyr Ser Val Met Leu Cys Gly Lys Val Ser Asn Asn Ile Leu Asp
 Asp
 35 40 45

5
 Ile Gly Gly Tyr Lys Glu Arg Asn Ile Leu Met Leu Arg Ala Ile
 Lys
 50 55 60

10
 Lys Ile Ile Ile Met Thr Ile Val Asn Ile Ile Phe Phe Tyr Ser
 Phe
 65 70 75 80

15
 Gln Ser Thr Ala Asp Glu Met Val Leu Ile Lys Lys Tyr Gly Phe
 Gly
 85 90 95

20
 Leu Glu Arg Asp Ile Lys Gly Arg Pro Leu Ile Tyr Pro Ile Glu
 Asn
 100 105 110

25
 Tyr Asp Glu Cys Lys Lys Lys Cys Asn His Met Asn Tyr Ile Ala
 Asp
 115 120 125

30
 Val Asn Ala Gln Leu Ala Met Ser Lys Lys Asn Asn Arg Ile Phe
 Ala
 130 135 140

35
 Asn Ile Thr Phe Thr Asn Asn Ser Ser Thr Thr Tyr Phe Phe Leu
 Asn
 145 150 155
 160

40
 Ile Ile Tyr Leu

45
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 42

50
 Met Asn Gln Ile Lys Asp Asn Lys Val Ile Met Lys Ile Lys Asn
 Leu
 1 5 10 15

5	Ile Tyr	Ser	Val	Ile	Leu	Leu	Ser	Gly	Gly	Ile	Met	Gly	Thr	Gly	Leu	
				20					25					30		
10	Ser Glu	Ser	Asp	Asn	His	Gln	Lys	Ile	Arg	Ser	Arg	Phe	Asn	Ile	Gln	
			35					40					45			
15	Ser Arg	Tyr	Cys	Ala	Ile	Lys	Thr	Asn	Gly	Val	Leu	Gly	Phe	Ser	Asn	
		50						55					60			
20	Lys Ser	Asp	Val	Leu	Arg	Glu	Asn	Gly	Asp	Ser	Thr	Gly	Thr	Thr	Ser	
	65					70					75				80	
25	Ser Ser	Thr	Asn	Ala	Met	Met	Leu	Met	Glu	Asn	Gly	Glu	Asn	Glu	Ile	
				85						90				95		
30	Leu Thr	Glu	Ile	Gly	Ala	Leu	Arg	Trp	Phe	Ser	Asp	Lys	Pro	Ala	Ser	
				100					105					110		
35	Glu Leu	Glu	Arg	Gly	His	Phe	Ser	Gln	Lys	Ala	Gly	Cys	Ser	Leu	Asp	
			115					120					125			
40	Val Val	Arg	Phe	Val	Lys	Gln	Glu	Glu	Thr	Ile	Leu	Ser	Ser	Ile	Lys	
		130						135					140			
45	Thr His	Ile	Asn	Gln	Gln	Gly	Ile	Pro	Glu	Ala	Gln	Pro	Asp	Ser	Met	
	145 160						150					155				
50	Pro Phe	Val	Ile	Arg	Lys	Glu	Ile	Leu	Ala	Glu	Gln	Ala	Glu	Pro	Gly	
					165					170				175		

Ile Asp Pro Asp Tyr Phe Asn Glu Thr Tyr Phe Pro Lys Gly Met
 Lys
 5 180 185 190

Val Tyr Gln Phe Thr Gln Lys Val Ser Val Ala Gly Leu Pro Asp
 Gly
 10 195 200 205

Pro Gly Arg Ser Thr Pro Phe Thr Gly Ala
 210 215
 15

<210> 43 <211> 2732 <212> PRT <213> Escherichia coli
 <400> 43

20 Met His Gln Pro Pro Val Arg Phe Thr Tyr Arg Leu Leu Ser Tyr
 Leu
 1 5 10 15

25 Val Ser Ala Ile Ile Ala Gly Gln Pro Leu Leu Pro Ala Val Gly
 Ala
 20 25 30

30 Val Ile Thr Pro Gln Asn Gly Ala Gly Met Asp Lys Ala Ala Asn
 Gly
 35 40 45

35 Val Pro Val Val Asn Ile Ala Thr Pro Asn Gly Ala Gly Ile Ser
 His
 50 55 60

40 Asn Arg Phe Thr Asp Tyr Asn Val Gly Lys Glu Gly Leu Ile Leu
 Asn
 65 70 75 80

45 Asn Ala Thr Gly Lys Leu Asn Pro Thr Gln Leu Gly Gly Leu Ile
 Gln
 85 90 95

50 Asn Asn Pro Asn Leu Lys Ala Gly Gly Glu Ala Lys Gly Ile Ile
 Asn

	100	105	110
5	Glu Val Thr Gly Gly Lys Arg Ser Leu Leu Gln Gly Tyr Thr Glu Val		
	115	120	125
10	Ala Gly Lys Ala Ala Asn Val Met Val Ala Asn Pro Tyr Gly Ile Thr		
	130	135	140
15	Cys Asp Gly Cys Gly Phe Ile Asn Thr Pro His Ala Thr Leu Thr Thr		
	145	150	155
	160		
20	Gly Lys Pro Val Met Asn Ala Asp Gly Ser Leu Gln Ala Leu Glu Val		
	165	170	175
25	Thr Glu Gly Ser Ile Thr Ile Asn Gly Ala Gly Leu Asp Gly Thr Arg		
	180	185	190
30	Ser Asp Ala Val Ser Ile Ile Ala Arg Ala Thr Glu Val Asn Ala Ala		
	195	200	205
35	Leu His Ala Lys Asp Leu Thr Val Thr Ala Gly Ala Asn Arg Val Thr		
	210	215	220
40	Ala Asp Gly Arg Val Arg Ala Leu Lys Gly Glu Gly Asp Val Pro Lys		
	225	230	235
	240		
45	Val Ala Val Asp Thr Gly Ala Leu Gly Gly Met Tyr Ala Arg Arg Ile		
	245	250	255
50			

5 Tyr Ala Arg Asp Gly Asp Ile Thr Leu Asp Ala Ser Gly Arg Leu
Thr
275 280 285

10 Val Asn Asn Ser Leu Ala Thr Gly Ala Val Thr Ala Lys Gly Gln
Gly
290 295 300

```

15      Val Thr Leu`Thr Gly Asp His Lys Ala Gly Gly Asn Leu Ser Val
      Ser
      305              310              315
      320

```

20

Ser Arg Arg Asp Ile Val Leu Ser Asn Gly Thr Leu Asn Ser Asp
Lys

325 330 335

Asp Leu Ser Leu Thr Ala Gly Gly Arg Ile Thr Gln Gln Asn Glu
Lys
340 345 350

Leu Thr Ala Gly Arg Asp Val Thr Leu Ala Ala Lys Asn Ile Thr
Gln
355 360 365

Asp Thr Ala Ser Gln Ile Asn Ala Ala Arg Asp Ile Val Thr Val
Ala
370 375 380

Ser Asp Thr Leu Thr Thr Gln Gly Gln Ile Thr Ala Gly Gln Asn
 Leu
 385 390 395
 45 400

Thr Ala Ser Ala Thr Thr Leu Thr Gln Asp Gly Ile Leu Leu Ala
Lys
50 . 405 . 410 . 415

	Ser	His	Ala	Gly	Leu	Asn	Ala	Gly	Thr	Leu	Asn	Asn	Ser	Gly	Ala	
	Val															
5					420					425					430	
	Gln	Gly	Ala	Thr	Leu	Thr	Leu	Gly	Ser	Thr	Thr	Leu	Ser	Asn	Ser	
	Gly															
10					435					440					445	
	Ser	Leu	Leu	Ser	Gly	Gly	Pro	Leu	Thr	Met	Asn	Thr	Arg	Asp	Phe	
	Thr															
15					450					455					460	
	Gln	Ser	Gly	Arg	Thr	Gly	Ala	Lys	Gly	Lys	Val	Asp	Ile	Met	Ala	
	Ser															
20	465					470						475				
	480															
	Gly	Lys	Leu	Thr	Ser	Thr	Gly	Leu	Leu	Val	Thr	Met	His	Leu	Val	
	Leu															
25					485					490					495	
	Lys	Ala	Gln	Asp	Val	Thr	Gln	Asn	Gly	Val	Leu	Ser	Gly	Gly	Lys	
	Gly															
30					500					505					510	
	Leu	Thr	Val	Ser	Ala	Thr	Ser	Ser	Gly	Lys	Lys	Ser	Val	Thr	His	
	Ser															
35					515					520					525	
	Asp	Ala	Ala	Met	Thr	Leu	Asn	Val	Thr	Thr	Val	Ala	Leu	Asp	Gly	
	Glu															
40					530					535					540	
	Thr	Ser	Ala	Gly	Asp	Thr	Leu	Arg	Val	Gln	Ala	Asp	Lys	Leu	Ser	
	Thr															
45	545					550						555				
	560															
	Ala	Ala	Gly	Ala	Gln	Leu	Gln	Ser	Gly	Lys	Asn	Leu	Ser	Ile	Asn	
	Ala															
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5	Arg Val	Asp	Ala	Arg	Leu	Ala	Gly	Thr	Gln	Ala	Ala	Gln	Gln	Thr	Met	
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10	Val Pro	Asn	Ala	Ser	Glu	Lys	Leu	Thr	His	Ser	Gly	Lys	Ser	Ser	Ala	
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15	Ser Val	Leu	Ser	Leu	Ser	Ala	Pro	Glu	Leu	Thr	Ser	Ser	Gly	Val	Leu	
		610					615						620			
20	Gly Leu 625 640	Ser	Ala	Leu	Asn	Thr	Gln	Ser	Gln	Thr	Leu	Thr	Asn	Ser	Gly	
							630						635			
25	Leu Asn	Gln	Gly	Glu	Ala	Ser	Leu	Thr	Val	Asn	Thr	Gln	Arg	Leu	Asp	
							645				650				655	
30	Gln Ile	Gln	Asn	Gly	Thr	Leu	Tyr	Ser	Ala	Ala	Asp	Leu	Thr	Leu	Asp	
							660				665				670	
35	Pro Met	Asp	Ile	Arg	Asn	Ser	Gly	Leu	Ile	Thr	Gly	Asp	Asn	Gly	Leu	
							675				680			685		
40	Leu Thr	Asn	Ala	Val	Ser	Leu	Ser	Asn	Pro	Gly	Lys	Ile	Ile	Ala	Asp	
							690				695			700		
45	Leu Gly 705 720	Ser	Val	Arg	Ala	Thr	Thr	Leu	Asp	Gly	Asp	Gly	Leu	Leu	Gln	
							710				715					
50	Ala His	Gly	Ala	Leu	Ala	Leu	Ala	Gly	Asp	Thr	Leu	Ser	Gln	Gly	Ser	

		725		730		735
5	Gly Arg Trp Leu Thr Ala Asp Asp Leu Ser Leu Arg Gly Lys Thr Leu	740		745		750
10	Asn Thr Ala Gly Thr Thr Gln Gly Gln Asn Ile Thr Val Gln Ala Asp	755		760		765
15	Arg Trp Ala Asn Ser Gly Ser Val Leu Ala Thr Gly Asn Leu Thr Ala	770		775		780
20	Ser Ala Thr Gly Gln Leu Thr Ser Thr Gly Asp Ile Met Ser Gln Gly 785 800		790		795	
25	Asp Thr Thr Leu Lys Ala Ala Thr Thr Asp Asn Arg Gly Ser Leu Leu		805		810	815
30	Ser Ala Gly Thr Leu Ser Leu Asp Gly Asn Ser Leu Asp Asn Arg Gly	820		825		830
35	Thr Val Gln Gly Asn His Val Thr Ile Arg Gln Asn Ser Val Thr Asn	835		840		845
40	Ser Gly Thr Leu Thr Gly Ile Ala Ala Leu Thr Leu Ala Ala Arg Met	850		855		860
45	Ala Ser Pro Gln Pro Ala Leu Met Asn Asn Gly Gly Ser Leu Leu Thr 865 880		870		875	
50						

Ser Gly Asp Leu Thr Ile Thr Ala Gly Ser Ile Thr Ser Ser Gly
 His
 885 890 895

5 Trp Gln Gly Lys Arg Val Leu Ile Thr Ala Asp Ser Leu Ala Asn
 Ser
 900 905 910

10 Gly Ala Ile Gln Ala Ala Asp Ser Leu Thr Ala Arg Leu Thr Gly
 Glu
 915 920 925

15 Leu Val Ser Thr Ala Gly Ser Lys Val Thr Ser Asn Gly Glu Met
 Ala
 930 935 940

20 Leu Ser Ala Leu Asn Leu Ser Asn Ser Gly Gln Trp Ile Ala Lys
 Asn
 945 950 955
 960

25 Leu Thr Leu Lys Ala Asn Ser Leu Thr Ser Ala Gly Asp Ile Thr
 Gly
 965 970 975

30 Val Asp Thr Leu Thr Leu Thr Val Asn Gln Thr Leu Asn Asn Gln
 Ala
 980 985 990

35 Asn Gly Lys Leu Leu Ser Ala Gly Val Leu Thr Leu Lys Ala Asp
 Ser
 995 1000 1005

40 Val Thr Asn Asp Gly Gln Leu Gln Gly Asn Val Thr Thr Ile Thr
 1010 1015 1020

45 Ala Gly Gln Leu Thr Asn Gly Gly His Leu Gln Gly Glu Thr Leu
 1025 1030 1035

50 Thr Leu Thr Ala Ser Gly Gly Val Asn Asn Arg Ser Gly Gly Val
 1040 1045 1050

5 Leu Met Ser Arg Asn Ala Leu Asn Val Ser Thr Ala Thr Leu Ser
 1055 1060 1065
 Asn Gln Ser Thr Ile Gln Gly Gly Gly Gly Val Ser Leu Asn Ala
 1070 1075 1080
 10 Thr Asp Arg Leu Gln Asn Asp Gly Lys Ile Leu Ser Gly Ser Asn
 1085 1090 1095
 15 Leu Thr Leu Thr Ala Gln Val Leu Ala Asn Thr Gly Ser Gly Leu
 1100 1105 1110
 20 Val Gln Ala Ala Thr Leu Leu Leu Asp Val Val Asn Thr Val Asn
 1115 1120 1125
 25 Gly Gly Arg Val Leu Ala Thr Gly Ser Asp Val Lys Gly Thr Thr
 1130 1135 1140
 Leu Asn Asn Thr Gly Thr Leu Gln Gly Ala Thr Leu Val Asn Tyr
 1145 1150 1155
 30 His Thr Phe Ser Ser Gly Thr Leu Leu Gly Thr Ser Gly Leu Gly
 1160 1165 1170
 35 Val Lys Gly Ser Ser Leu Leu Gln Asn Gly Thr Gly Arg Leu Tyr
 1175 1180 1185
 40 Ser Ala Gly Asn Leu Leu Leu Asp Ala Gln Asp Phe Ser Gly Gln
 1190 1195 1200
 45 Gly Gln Val Val Ala Thr Gly Asp Val Thr Leu Lys Leu Ile Ala
 1205 1210 1215
 Ala Leu Thr Asn His Gly Thr Leu Ala Ala Gly Lys Thr Leu Ser
 1220 1225 1230
 50 Val Thr Ser Gln Asn Ala Ile Thr Asn Gly Gly Val Met Gln Gly

	1235		1240		1245									
5	Asp 1250	Ala	Met	Val	Leu	Gly	Ala 1255	Gly	Glu	Ala	Phe	Thr 1260	Asn	Asn Gly
10	Leu 1265	Thr	Ala	Gly	Lys	Gly	Asn 1270	Ser	Val	Phe	Ser	Ala 1275	Gln	Arg Leu
15	Phe 1280	Leu	Asn	Ala	Pro	Gly	Ser 1285	Leu	Gln	Gly	Gly	Gly 1290	Asp	Val Ser
20	Leu 1295	Asn	Ser	Arg	Ser	Asp	Ile 1300	Thr	Ile	Ser	Gly	Phe 1305	Thr	Gly Thr
25	Ala 1310	Gly	Ser	Leu	Thr	Met	Asn 1315	Val	Ala	Gly	Thr	Leu 1320	Leu	Asn Ser
30	Ala 1325	Leu	Ile	Tyr	Ala	Gly	Asn 1330	Asn	Leu	Lys	Leu	Phe 1335	Thr	Asp Arg
35	Leu 1340	His	Asn	Gln	His	Gly	Asp 1345	Ile	Leu	Ala	Gly	Asn 1350	Ser	Leu Trp
40	Val 1355	Gln	Lys	Asp	Ala	Ser	Gly 1360	Gly	Ala	Asn	Thr	Glu 1365	Ile	Ile Asn
45	Asn 1370	Ser	Gly	Asn	Ile	Glu	Thr 1375	His	Gln	Gly	Asp	Ile 1380	Val	Val Arg
50	Thr 1385	Gly	His	Leu	Leu	Asn	Gln 1390	Arg	Glu	Gly	Phe	Ser 1395	Ala	Thr Thr
	Thr 1400	Thr	Arg	Thr	Asn	Pro	Ser 1405	Ser	Ile	Gln	Gly	Met 1410	Gly	Asn Ala
	Leu 1415	Val	Asp	Ile	Pro	Leu	Ser 1420	Leu	Leu	Pro	Asp	Gly 1425	Ser	Tyr Gly

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	Tyr	Phe	Thr	Arg	Glu	Val	Glu	Asn	Gln	His	Gly	Thr	Pro	Cys	Asn
	1430						1435					1440			
5	Gly	His	Gly	Ala	Cys	Asn	Ile	Thr	Met	Asp	Thr	Leu	Tyr	Tyr	Tyr
	1445						1450					1455			
10	Ala	Pro	Phe	Ala	Asp	Ser	Ala	Thr	Gln	Arg	Phe	Leu	Ser	Ser	Gln
	1460						1465					1470			
15	Asn	Ile	Thr	Thr	Val	Thr	Gly	Ala	Asp	Asn	Pro	Ala	Gly	Arg	Ile
	1475						1480					1485			
20	Ala	Ser	Gly	Arg	Asn	Leu	Ser	Ala	Glu	Ala	Glu	Arg	Leu	Glu	Asn
	1490						1495					1500			
25	Arg	Ala	Ser	Phe	Ile	Leu	Ala	Asn	Gly	Asp	Ile	Ala	Leu	Ser	Gly
	1505						1510					1515			
30	Arg	Glu	Leu	Ser	Asn	Gln	Ser	Trp	Gln	Thr	Gly	Thr	Glu	Asn	Glu
	1520						1525					1530			
35	Tyr	Leu	Val	Tyr	Arg	Tyr	Asp	Pro	Lys	Thr	Phe	Tyr	Gly	Ser	Tyr
	1535						1540					1545			
40	Ala	Thr	Gly	Ser	Leu	Asp	Lys	Leu	Pro	Leu	Leu	Ser	Pro	Glu	Phe
	1550						1555					1560			
45	Glu	Asn	Asn	Thr	Ile	Arg	Phe	Ser	Leu	Asp	Gly	Arg	Glu	Lys	Asp
	1565						1570					1575			
50	Tyr	Thr	Pro	Gly	Lys	Thr	Tyr	Tyr	Ser	Val	Ile	Gln	Ala	Gly	Gly
	1580						1585					1590			
55	Asp	Val	Lys	Thr	Arg	Phe	Thr	Ser	Ser	Ile	Asn	Asn	Gly	Thr	Thr
	1595						1600					1605			
60	Thr	Ala	His	Ala	Gly	Ser	Val	Ser	Pro	Val	Val	Ser	Ala	Pro	Val
	1610						1615					1620			

	Leu	Asn	Thr	Leu	Ser	Gln	Gln	Thr	Gly	Gly	Asp	Ser	Leu	Thr	Gln
	1625						1630					1635			
5	Thr	Ala	Leu	Gln	Gln	Tyr	Glu	Pro	Val	Val	Val	Gly	Ser	Pro	Gln
	1640						1645					1650			
10	Trp	His	Asp	Glu	Leu	Ala	Gly	Ala	Leu	Lys	Asn	Ile	Ala	Gly	Gly
	1655						1660					1665			
15	Ser	Pro	Leu	Thr	Gly	Gln	Thr	Gly	Ile	Ser	Asp	Asp	Trp	Pro	Leu
	1670						1675					1680			
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	1685						1690					1695			
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	1700						1705					1710			
30	Gln	Val	Asp	Ser	His	Leu	Phe	Ala	Gly	Leu	Tyr	Glu	Leu	Leu	Gly
	1715						1720					1725			
35	Ala	Lys	Pro	Gly	Gln	Ala	Pro	Arg	Glu	Thr	Ala	Pro	Ser	Tyr	Thr
	1730						1735					1740			
40	Asp	Glu	Lys	Gln	Phe	Leu	Gly	Ser	Ser	Tyr	Phe	Leu	Asp	Arg	Leu
	1745						1750					1755			
45	Gly	Leu	Lys	Pro	Glu	Lys	Asp	Tyr	Arg	Phe	Leu	Gly	Asp	Ala	Val
	1760						1765					1770			
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	1775						1780					1785			
55	Ser	Arg	Tyr	Leu	Asn	Gly	Leu	Gly	Ser	Asp	Thr	Glu	Gln	Met	Arg
	1790						1795					1800			
60	Tyr	Leu	Met	Asp	Asn	Ala	Ala	Arg	Gln	Gln	Lys	Gly	Leu	Gly	Leu
	1805						1810					1815			

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	2000					2005						2010			
5	Asn 2015	Ile	Ala	Ala	Asn	Leu	Ile 2020	Ser	Gly	Ser	Lys	Ser 2025	Gln	Ser	Gly
10	Phe 2030	Trp	His	Thr	Asp	Asp	Asn 2035	Ser	Ser	Ser	Ser	Thr 2040	Thr	Ser	Gln
15	Gly 2045	Ser	Ser	Ile	Ser	Ala	Gly 2050	Gly	Asn	Leu	Ala	Met 2055	Ala	Ala	Gly
	His 2060	Asn	Leu	Asp	Val	Thr	Ala 2065	Ser	Ser	Val	Ser	Ala 2070	Gly	His	Ser
20	Ala 2075	Leu	Leu	Ser	Cys	Arg	Ser 2080	Arg	Pro	Ser	Leu	Glu 2085	Cys	Ser	Gln
25	Gly 2090	Lys	Ala	Lys	Thr	Ser	Arg 2095	Asn	Gly	Arg	Ser	Glu 2100	Ser	His	Glu
30	Ser 2105	His	Ala	Ala	Val	Ser	Thr 2110	Val	Thr	Ala	Gly	Asp 2115	Asn	Phe	Leu
	Leu 2120	Val	Ala	Gly	Arg	Asp	Ile 2125	Ala	Ser	Gln	Ala	Ala 2130	Gly	Met	Ala
35	Ala 2135	Glu	Asn	Asn	Val	Val	Ile 2140	Arg	Gly	Gly	Arg	Asp 2145	Val	Asn	Leu
40	Val 2150	Ala	Glu	Ser	Ala	Gly	Ala 2155	Gly	Asp	Ser	Tyr	Thr 2160	Ser	Lys	Lys
45	Lys 2165	Lys	Glu	Ile	Asn	Glu	Thr 2170	Val	Arg	Gln	Gln	Gly 2175	Thr	Glu	Ile
50	Ala 2180	Ser	Gly	Gly	Asp	Thr	Thr 2185	Val	Asn	Ala	Gly	Arg 2190	Asp	Ile	Thr

	Ala	Val	Ala	Ser	Ser	Val	Thr	Ala	Thr	Gly	Asn	Ile	Ser	Val	Asn
	2195						2200					2205			
5	Ala	Gly	Arg	Asp	Val	Ala	Leu	Thr	Thr	Ala	Thr	Glu	Ser	Asp	Tyr
	2210						2215					2220			
10	His	Tyr	Leu	Glu	Thr	Lys	Lys	Lys	Ser	Gly	Gly	Phe	Leu	Ser	Lys
	2225						2230					2235			
15	Lys	Thr	Thr	Arg	Thr	Ile	Ser	Glu	Asp	Ser	Ala	Thr	Arg	Glu	Ala
	2240						2245					2250			
20	Gly	Ser	Leu	Leu	Ser	Gly	Asn	Arg	Val	Thr	Val	Asn	Ala	Gly	Asp
	2255						2260					2265			
25	Asn	Leu	Thr	Val	Glu	Gly	Ser	Asp	Val	Val	Ala	Asp	Arg	Asp	Val
	2270						2275					2280			
30	Ser	Leu	Ala	Ala	Gly	Asn	His	Val	Asp	Val	Leu	Ala	Ala	Thr	Ser
	2285						2290					2295			
35	Thr	Asp	Thr	Ser	Trp	Arg	Phe	Lys	Glu	Thr	Lys	Lys	Ser	Gly	Leu
	2300						2305					2310			
40	Met	Gly	Thr	Gly	Gly	Ile	Gly	Phe	Thr	Ile	Gly	Ser	Ser	Lys	Thr
	2315						2320					2325			
45	Thr	His	Asp	Arg	Arg	Glu	Ala	Gly	Thr	Thr	Gln	Ser	Gln	Ser	Ala
	2330						2335					2340			
50	Ser	Thr	Ile	Gly	Ser	Thr	Ala	Gly	Asn	Val	Ser	Ile	Thr	Ala	Gly
	2345						2350					2355			
55	Lys	Gln	Ala	His	Ile	Ser	Gly	Ser	Asp	Val	Ile	Ala	Asn	Arg	Asp
	2360						2365					2370			
60	Ile	Ser	Ile	Thr	Gly	Asp	Ser	Val	Val	Val	Asp	Pro	Gly	His	Asp
	2375						2380					2385			

	Arg	Arg	Thr	Val	Asp	Glu	Lys	Phe	Glu	Gln	Lys	Lys	Ser	Gly	Leu
	2390						2395					2400			
5	Thr	Val	Ala	Leu	Ser	Gly	Thr	Val	Gly	Ser	Ala	Ile	Asn	Asn	Ala
	2405						2410					2415			
10	Val	Thr	Ser	Ala	Gln	Glu	Thr	Lys	Glu	Ser	Ser	Asp	Ser	Arg	Leu
	2420						2425					2430			
15	Lys	Ala	Leu	Gln	Ala	Thr	Lys	Thr	Ala	Leu	Ser	Gly	Val	Gln	Ala
	2435						2440					2445			
20	Gly	Gln	Ala	Ala	Thr	Met	Ala	Ser	Ala	Thr	Gly	Asp	Pro	Asn	Ala
	2450						2455					2460			
25	Gly	Val	Ser	Leu	Ser	Leu	Thr	Thr	Gln	Lys	Ser	Lys	Ser	Gln	Gln
	2465						2470					2475			
30	His	Ser	Glu	Ser	Asp	Thr	Val	Ser	Gly	Ser	Thr	Leu	Asn	Ala	Gly
	2480						2485					2490			
35	Asn	Asn	Leu	Ser	Val	Val	Ala	Thr	Gly	Lys	Asn	Arg	Gly	Asp	Asn
	2495						2500					2505			
40	Arg	Gly	Asp	Ile	Val	Ile	Ala	Gly	Ser	Gln	Leu	Lys	Ala	Gly	Gly
	2510						2515					2520			
45	Asn	Thr	Ser	Leu	Asp	Ala	Ala	Asn	Asp	Ile	Leu	Leu	Ser	Gly	Ala
	2525						2530					2535			
50	Ala	Asn	Thr	Gln	Lys	Thr	Thr	Gly	Arg	Asn	Ser	Ser	Ser	Gly	Gly
	2540						2545					2550			
55	Gly	Val	Gly	Val	Ser	Ile	Gly	Ala	Gly	Lys	Gly	Ala	Gly	Ile	Ser
	2555						2560					2565			
60	Ala	Phe	Ala	Ser	Val	Asn	Ala	Ala	Lys	Gly	Arg	Glu	Lys	Gly	Asn
	2570						2575					2580			

5 Gly Thr Thr Thr Asp Lys Thr Val Thr Ile Asn Ser Gly Arg Asp
 2585 2590 2595
 Thr Val Leu Asn Gly Ala Gln Val Asn Gly Asn Arg Ile Ile Ala
 2600 2605 2610
 10 Asp Val Gly His Asp Leu Leu Ile Ser Ser Gln Gln Asp Thr Ser
 2615 2620 2625
 15 Lys Tyr Asp Ser Lys Gln Thr Ser Val Ala Ala Gly Gly Ser Phe
 2630 2635 2640
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 2645 2650 2655
 Asp Lys Met Lys Ser Arg Phe Asp Ser Val Ala Glu Gln Thr Gly
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 25 Met Phe Ala Arg Val Met Val Ala Ser Thr Ser Gln Trp Val Asn
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 30 Ile Pro Asn Trp Met Val Arg Ser Leu Pro His Cys His Thr Gly
 2690 2695 2700
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 Asn
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5 Tyr Ala Tyr Arg Ser Ala Asp Val Phe Met Pro Tyr Ile Lys Ser
Asn
35 40 45

10 Phe Asn Pro Val Thr Asp Ser Ala Leu Asn Val Ser Leu Thr Tyr
Met
50 55 60

15 Tyr Gln Asp Gln Tyr Gly Lys Lys His Lys Lys Thr Ser Glu Asp
Arg
65 70 75 80

20 Phe Lys Thr Asn Arg Asp Arg Ile Glu Leu Tyr Leu Lys Gly Tyr
Thr
85 90 95

25 Leu Asn Arg Gly Ala Tyr Ser Phe Ser Pro Ser Ala Gly Phe Arg
Tyr
 100 105 110

30 Glu Ser Trp Asp Val Asn Tyr Asp Asn Pro Lys Lys Gln Asp Lys
Trp

 115 120 125

35 Lys Leu Glu Leu Arg Phe Tyr Pro Asn Met Thr Tyr Lys Leu Asn
Asp 130 135 140

40 Gln Leu Ser Leu Tyr Met Asn Gly Phe Val Ala Pro Val Phe Phe
Lys
145 150 155
160

45

Thr Gln Gln Glu Ser Arg Lys Asp Asn Asn Tyr Val Lys Gly Lys
Leu

165 170 175

50

Gly Ala Lys Arg Tyr Asn Asn Asp Tyr Tyr Gln Glu Leu Gln Ile
 Leu
 180 185 190

5

Gly Val Arg Tyr Lys Phe Asn Asn Asp Asn Thr Leu Trp Ala Ser
 Val
 195 200 205

10

Tyr Asn Glu Arg Lys Tyr Asn Gln His Ser Ser Lys Tyr Asp Arg
 Trp
 210 215 220

15

Gln Leu Arg Gly Gly Tyr Asp Phe Lys Val Thr Glu Glu Phe Val
 Leu
 225 230 235
 240

20

Ser Pro Phe Ile Arg Tyr Asp Leu Ser Tyr Arg Glu Lys Asn Leu
 Glu
 245 250 255

25

Ser Thr Ser Asn Asn Gly Leu Ser Lys Asn Asn Lys Glu Ile Arg
 Thr
 260 265 270

30

Gly Ala Ser Phe Ser Tyr Lys Ile Ile Pro Ser Val Lys Leu Val
 Gly
 275 280 285

35

Glu Ile Tyr Arg Gln Thr Thr Asn Ile Glu Asn Tyr Tyr Gly Glu
 His
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40

Ser Glu Asp Lys Asn Arg Met Phe Tyr Lys Leu Gly Ile Asn Lys
 Thr
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 320

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Phe

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Ser
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10 Arg Ala Leu Ser Val Pro Cys Cys Asp Met Phe Arg Arg Gly Ser
Pro
20 25 30

15 Trp Ile Cys Tyr Leu Ser Leu Ser Val Phe Ser Gly Cys Phe Ile
Pro
35 40 45

20 Ala Phe Ser Ser Pro Ala Ala Met Leu Ser Pro Gly Asp Arg Ser
Ala
50 55 60

25 Ile Gln Gln Gln Gln Gln Gln Leu Leu Asp Glu Asn Gln Arg Gln
Arg
65 70 75 80

30 Asp Ala Leu Glu Arg Pro Leu Thr Ile Thr Pro Ser Pro Glu Thr
Ser
85 90 95

35 Ala Gly Thr Glu Gly Pro Cys Phe Thr Val Ser Ser Ile Val Val
Ser
100 105 110

40 Gly Ala Thr Arg Leu Thr Ser Ala Glu Thr Asp Arg Leu Val Pro
Trp
115 120 125

45 Val Asn Gln Cys Leu Asn Ile Thr Gly Leu Thr Ala Val Thr Asp
Ala
130 135 140

50 Val Thr Asp Gly Tyr Ile Arg Arg Gly Tyr Ile Thr Ser Arg Ala
Phe

145		150		155
160				
5	Leu Thr Glu Gln Asp Leu Ser Gly Gly Val Leu His Ile Thr Val Met	165	170	175
10	Glu Gly Arg Leu Gln Gln Ile Arg Ala Glu Gly Ala Asp Leu Pro Ala	180	185	190
15	Arg Thr Leu Lys Met Val Phe Pro Gly Met Glu Gly Lys Val Leu Asn	195	200	205
20	Leu Arg Asp Ile Glu Gln Gly Met Glu Gln Ile Asn Arg Leu Arg Thr	210	215	220
25	Glu Pro Val Gln Ile Glu Ile Ser Pro Gly Asp Arg Glu Gly Trp Ser	225	230	235
	240			
30	Val Val Thr Leu Thr Ala Leu Pro Glu Trp Pro Val Thr Gly Ser Val	245	250	255
35	Gly Ile Asp Asn Ser Gly Gln Lys Ser Thr Gly Thr Gly Gln Leu Asn	260	265	270
40	Gly Val Leu Ser Phe Asn Asn Pro Leu Gly Leu Ala Asp Asn Trp Phe	275	280	285
45	Val Ser Gly Gly Arg Ser Ser Asp Phe Ser Val Ser His Asp Ala Arg	290	295	300
50				

	Asn	Phe	Ala	Ala	Gly	Val	Ser	Leu	Pro	Tyr	Gly	Tyr	Thr	Leu	Val
	Asp														
	305					310						315			
5	320														
	Tyr	Thr	Tyr	Ser	Trp	Ser	Asp	Tyr	Leu	Ser	Thr	Ile	Asp	Asn	Arg
	Gly														
					325					330					335
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	Trp	Arg	Trp	Arg	Ser	Thr	Gly	Asp	Leu	Gln	Thr	His	Arg	Leu	Gly
	Leu														
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	Ser	His	Val	Leu	Phe	Arg	Asn	Gly	Asp	Met	Lys	Thr	Ala	Leu	Thr
	Gly														
			355					360					365		
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	Leu														
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25															
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	His														
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	Thr														
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	Gly														
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	Phe														
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	Gln	Arg	Pro	Val	Thr	Asp	Arg	Val	Trp	Trp	Leu	Thr	Ser	Ala	Tyr
	Ala														
50		450					455					460			

Gln Trp Ser Pro Asp Arg Leu His Gly Val Glu Gln Leu Ser Leu
 Gly
 465 470 475
 5 480

Gly Glu Ser Ser Val Arg Gly Phe Lys Asp Gln Tyr Ile Ser Gly
 Asn
 10 485 490 495

Asn Gly Gly Tyr Leu Arg Asn Glu Leu Ser Trp Ser Leu Phe Ser
 Leu
 15 500 505 510

Pro Tyr Val Gly Thr Val Arg Ala Val Ala Ala Leu Asp Gly Gly
 Trp
 20 515 520 525

Leu His Ser Asp Ser Asp Asp Pro Tyr Ser Ser Gly Thr Leu Trp
 Gly
 25 530 535 540

Ala Ala Ala Gly Leu Ser Thr Thr Ser Gly His Val Ser Gly Ser
 Phe
 30 545 550 555
 560

Thr Ala Gly Leu Pro Leu Val Tyr Pro Asp Trp Leu Ala Pro Asp
 His
 35 565 570 575

Leu Thr Val Tyr Trp Arg Val Ala Val Ala Phe
 40 580 585

<210> 46 <211> 744 <212> PRT <213> Escherichia coli <400>
 46

45 Met Asn Lys His Thr Leu Leu Leu Thr Val Leu Phe Leu Asn Leu
 Ile
 1 5 10 15

50

Cys Thr Pro Val Phe Ala Gln Asn Trp Gln Val Ala Thr Phe Gly
Gln
20 25 30

5 Ser Thr Asp Leu Asn Phe Ser Ser Leu Ile Asp Ser Ala Lys Ile
Gly
35 40 45

10 Arg Asn Asn Ala Trp Leu Ala Gly Asn Asn Asn Phe Leu Glu Ala
Gly
50 55 60

15 Lys Phe Tyr Thr Leu Pro Thr Asp Phe Phe Ile Glu Ser Arg Gly
Gly
65 70 75 80

20 Lys Ile Ala Asn Ser His Asp Gly Met Thr Val Phe Tyr Thr Ile
Val
85 90 95

25 Pro Val Thr Gln Thr Phe Arg Leu Glu Ala Asp Leu Thr Leu Glu
Gln
 100 105 110

30 Ile Gly Pro Glu Val Asn Gly Lys Ser Pro Ala Gly Gln Glu Gly
Ala
115 120 125

35 Gly Leu Phe Val Arg Asp Ile Ile Gly Pro Gln Arg Gln Glu Pro
Gln
130 135 140

40 Ser Ala Gly Thr Glu Glu Tyr Pro Gln Ala Ser Asn Ile Leu Met
Asn
145 150 155
160

45

Ala Phe Ile Thr Gln Asn Lys Lys Asn Asp Asn Leu Val Gln Ile
Thr

165 170 175

50

	Ser	Ile	Val	Arg	Glu	Gly	Val	Ile	Lys	Thr	Trp	Gly	Asn	Glu	Gly	
	Ile															
					180				185					190		
5	Thr	Ile	Lys	Lys	Gln	Pro	Ile	Ile	Glu	Asn	Ile	Asn	Phe	Thr	Gln	
	Lys															
					195				200				205			
10	Arg	Asn	Ile	His	Met	Thr	Ile	Glu	Arg	Leu	Pro	Glu	Lys	Phe	Ile	
	Leu															
		210						215				220				
15	Thr	Ala	Phe	Asp	Thr	Asp	Arg	Lys	Glu	Asn	Gln	Ser	Trp	Gln	Phe	
	Ser															
	225						230					235				
	240															
20																
	Asp	Tyr	Ser	Gly	Phe	Met	Asn	Gln	Leu	Asp	Asn	Asn	Ser	Leu	Ala	
	Ile															
					245					250					255	
25																
	Gly	Phe	Phe	Ala	Ala	Arg	Asn	Ala	Lys	Leu	Arg	Val	Lys	Asn	Ala	
	Ser															
				260						265				270		
30																
	Phe	Lys	Pro	Gly	Lys	Pro	Leu	Val	Asp	Tyr	Lys	Gln	Leu	Thr	Ser	
	Arg															
				275					280				285			
35																
	Gln	Phe	Ser	Arg	Val	Arg	His	Lys	Ala	Pro	Glu	Leu	Phe	Leu	Ala	
	Ser															
		290						295				300				
40																
	Pro	Gln	Ser	Val	Val	Arg	Asn	Ser	Thr	Thr	Leu	Gln	Phe	Leu	Ala	
	Asn															
	305						310					315				
45	320															
	Gln	Ala	Gly	Ile	Val	Ser	Ile	Asp	Asn	Asp	Lys	Gln	Thr	Lys	Gln	
	Val															
50					325					330					335	

	Gln	Ala	Gly	Glu	Leu	Val	Gln	Phe	Pro	Val	Thr	Leu	Gln	Lys	Lys	
	His															
				340					345					350		
5																
	Asn	Asp	Phe	Thr	Val	Asn	Phe	Asn	Val	Asp	Gly	Asn	Ile	Ser	Lys	
	Lys															
			355					360					365			
10																
	Ala	Ile	Arg	Ile	Glu	Gln	Val	Lys	Ser	Asn	Leu	Thr	Asp	Pro	Tyr	
	Glu															
		370					375					380				
15																
	Ile	Tyr	Val	Cys	Ser	Asp	Cys	Arg	Gln	Gly	Ala	Arg	Gly	Ser	Lys	
	Asn															
	385					390					395					
20	400															
	Asp	Pro	Val	Asp	Leu	Gln	Thr	Ala	Val	Lys	Phe	Val	Ala	Pro	Gly	
	Gly															
25					405					410					415	
	Asn	Ile	Tyr	Leu	Asn	Asp	Gly	Gln	Tyr	His	Gly	Ile	Thr	Leu	Asp	
	Arg															
30				420				425						430		
	Glu	Leu	Ser	Gly	Ile	Pro	Gly	Lys	Tyr	Lys	Thr	Ile	Ser	Ala	Ile	
	Asn															
35			435					440						445		
	Pro	His	Lys	Ala	Ile	Phe	Ile	Asn	Lys	Thr	Phe	Asn	Leu	Asp	Ala	
	Ser															
40		450					455					460				
	Tyr	Trp	His	Leu	Lys	Ser	Val	Val	Phe	Asp	Gly	Asn	Val	Asp	Asn	
	Gly															
45	465					470					475					
	480															
	Asn	Asn	Lys	Pro	Ala	Tyr	Leu	Arg	Ile	Ala	Gly	Ser	Tyr	Asn	Ile	
	Ile															
50					485					490					495	

5	Glu His Val Ile Ala Arg Asn Asn Asp Asp Thr Gly Ile Ser Ile Ser	500	505	510
10	Ala Lys Asp Lys Asn Arg Phe Phe Trp Pro Ala His Asn Leu Val Leu	515	520	525
15	Asn Ser Asp Ser Tyr Asn Asn Leu Asp Leu Ser Gly Ile Asn Ala Asp	530	535	540
20	Gly Phe Ala Ala Lys Leu Gly Val Gly Pro Gly Asn Ile Phe Arg Gly 545 560	550	555	
25	Cys Ile Ala His Asn Asn Ala Asp Asp Gly Trp Asp Leu Phe Asn Lys	565	570	575
30	Ile Glu Asp Gly Pro Asn Ala Ser Val Thr Ile Glu Asn Ser Val Ala	580	585	590
35	Tyr Glu Asn Gly Leu Pro Tyr Asn Lys Ala Asp Ile Leu Lys Gly Ser	595	600	605
40	Ile Gly Asn Gly Gly Glu Gly Gln Pro Ser Lys Ser Gln Val Ile Asn	610	615	620
45	Ser Ile Ala Ile Asn Asn Asn Met Asp Gly Phe Thr Asp Asn Phe Asn 625 640	630	635	
50	Thr Gly Ser Leu Ile Val Arg Asn Asn Ile Ala Met Asn Asn Ala Arg			

		645		650		655
5	Tyr Asn Tyr Ile Leu Arg Thr Asn Pro Tyr Lys Phe Pro Ser Ser Ile	660		665		670
10	Leu Phe Asp Asn Asn Tyr Ser Ile Arg Asp Asp Trp Glu Asn Lys Ile	675		680		685
15	Lys Asp Phe Leu Gly Asp Thr Val Asn Ser Val Asn Tyr Lys Leu Leu	690		695		700
20	Val Ser His Glu Thr Gly Pro Val Gln Lys Asp Leu Phe Phe Thr Arg 705 720		710		715	
25	Asp Asp Ser Gly Asn Ile Ile Tyr Pro Asp Phe Phe Leu Asn Ile Ile	725		730		735
30	Asn Lys Phe Asn Glx Thr Met Pro 740					
35	<210> 47 <211> 136 <212> PRT <213> Escherichia coli <400> 47					
40	Met Lys Thr Phe Ile Lys Thr Leu Leu Val Ala Val Thr Ile Leu Phe 1 5 10 15					
45	Ser Val Phe Ala Thr Ala Lys Gln Val Lys Leu Pro Asn Asn Ile Lys 20 25 30					
50	Tyr Val Asn Thr Thr Glu Ala Phe Ser Cys Thr Glu Ile Asp Gly Met 35 40 45					

Asn Cys Gln Thr Lys Asn Pro Phe Asn Tyr Lys Asp Asn Ser Tyr
 Val
 50 55 60

5
 Phe Val Leu Glu Arg Gly Gly Ala Trp Cys Tyr Asp Tyr Thr Val
 Ser
 65 70 75 80

10
 Val Leu Asn Leu Lys Thr Gly Lys Ala Gln Met Leu Glu Tyr Lys
 Asp
 85 90 95

15
 Asn Gln Leu Cys Ser Gly Ser Asn Lys Pro Phe Phe Glu Ile Lys
 Asn
 100 105 110

20
 Gly Val Pro Thr Val Gly Val Ile Asp Thr Ser Gly Lys Pro Val
 Val
 115 120 125

25
 Val Ala Leu Asp Lys Leu Lys Thr
 130 135

30 <210> 48 <211> 225 <212> PRT <213> Escherichia coli <400>
 48

Met Gln Leu Pro Val Lys Leu Leu Met Ser Leu Ile Ser Leu Val
 Ser
 35 1 5 10 15

Val Ile Ala Arg Ala Gly Lys Tyr Lys Asn Tyr Ile Arg Asp Glu
 Ile
 40 20 25 30

Lys Tyr Trp Arg Tyr Thr Ser Tyr Lys Gly Gly Glu Phe Pro Glu
 Gly
 45 35 40 45

Phe Thr Asp Glu Lys Phe Ser Ser Ala Ile Tyr Asn Gly Arg Ile
 Phe
 50 50 55 60

5	Thr Met Lys Arg Leu His Thr Leu Met Leu Phe Leu Ala Val Leu Phe 65	70	75	80
10	Thr Gly Phe Asn Val Glu Ala Ala Ser Val Lys Gln Ala Leu Ser Cys	85	90	95
15	Asp Pro Asn Ala Arg Ala Glu Gln Pro Gly Ala Cys Pro Thr Thr Tyr	100	105	110
20	Glu Leu Tyr Glu Gly Asp Ala Ala Tyr Lys Ala Ala Leu Asp Lys Ala	115	120	125
25	Leu Lys Pro Val Gly Leu Ser Gly Met Phe Gly Lys Gly Gly Tyr Met	130	135	140
30	Asp Gly Pro Gly Gly Asn Val Thr Pro Val Thr Ile Asn Gly Thr Val 145 160	150	155	
35	Trp Leu Gln Gly Asp Gly Cys Lys Ala Asn Thr Cys Gly Trp Asp Phe	165	170	175
40	Ile Val Thr Leu Tyr Asn Pro Lys Thr His Glu Val Val Gly Tyr Arg	180	185	190
45	Tyr Phe Gly Leu Asp Asp Pro Ala Tyr Leu Val Trp Phe Gly Glu Ile	195	200	205
50	Gly Val His Glu Phe Ala Tyr Leu Val Lys Asn Tyr Val Ala Ala Val	210	215	220

Asn
225

5
<210> 49 <211> 721 <212> PRT <213> Escherichia coli <400>
49

10 Met Lys Thr Gln Ile Thr Phe Ala Ala Leu Leu Pro Ala Leu Ala
Ser
1 5 10 15

15 Phe Ile Pro Leu His Ala His Ala Ser Ser Thr Ser Glu Asp Glu
Met
20 25 30

20 Ile Val Thr Gly Asn Thr Ala Ala Asp Thr Thr Asp Ser Ala Ala
Gly
35 40 45

25 Ala Gly Phe Lys Thr Asn Asp Ile Asp Val Gly Pro Leu Gly Thr
Lys
50 55 60

30 Ser Trp Ile Glu Thr Pro Tyr Ser Ser Thr Thr Val Thr Lys Glu
Met
65 70 75 80

35 Ile Glu Asn Gln Gln Ala Gln Ser Val Ser Glu Met Leu Lys Tyr
Ser
85 90 95

40 Pro Ser Thr Gln Met Gln Ala Arg Gly Gly Met Asp Val Gly Arg
Pro
100 105 110

45 Gln Ser Arg Gly Met Gln Gly Ser Val Val Ala Asn Ser Arg Leu
Asp
115 120 125

50 Gly Leu Asn Ile Val Ser Thr Thr Ala Phe Pro Val Glu Met Leu
Glu
130 135 140

5	Arg Met Asp Val Leu Asn Ser Leu Thr Gly Ala Leu Tyr Gly Pro Ala 145 160	150	155
10	Ser Pro Ala Gly Gln Phe Asn Phe Val Ala Lys Arg Pro Thr Glu Glu	165	170 175
15	Thr Leu Arg Lys Val Thr Leu Gly Tyr Gln Ser Arg Ser Ala Phe Thr	180	185 190
20	Gly His Ala Asp Leu Gly Gly His Phe Asp Glu Asn Lys Arg Phe Gly	195	200 205
25	Tyr Arg Val Asn Leu Leu Asp Gln Glu Gly Glu Gly Asn Val Asp Asp	210	215 220
30	Ser Thr Leu Arg Arg Lys Leu Val Ser Val Ala Leu Asp Trp Asn Ile 225 240	230	235
35	Gln Pro Gly Thr Gln Leu Gln Leu Asp Ala Ser His Tyr Glu Phe Ile	245	250 255
40	Gln Lys Gly Tyr Val Gly Ser Phe Asn Tyr Gly Pro Asn Val Lys Leu	260	265 270
45	Pro Ser Ala Pro Asn Pro Lys Asp Lys Asn Leu Ala Leu Ser Thr Ala	275	280 285
50	Gly Asn Asp Leu Thr Thr Asp Thr Ile Ser Thr Arg Leu Ile His Tyr		

	290		295		300
5	Phe Asn Asp Asp Trp Ser Met Asn Ala Gly Val Gly Trp Gln Gln Ala 305 320		310		315
10	Asp Arg Ala Met Arg Ser Val Ser Ser Lys Ile Leu Asn Asn Gln Gly	325		330	335
15	Asp Ile Ser Arg Ser Met Lys Asp Ser Thr Ala Ala Gly Arg Phe Arg	340		345	350
20	Val Leu Ser Asn Thr Ala Gly Leu Asn Gly His Ile Asp Thr Gly Ser	355	360		365
25	Ile Gly His Asp Leu Ser Leu Ser Thr Thr Gly Tyr Val Trp Ser Leu	370	375		380
30	Tyr Ser Ala Lys Gly Thr Gly Ser Ser Tyr Ser Trp Gly Thr Thr Asn 385 400	390		395	
35	Met Tyr His Pro Asp Ala Ile Asp Glu Gln Gly Asp Gly Lys Ile Arg	405		410	415
40	Thr Gly Gly Pro Arg Tyr Arg Ser Ser Val Asn Thr Gln Gln Ser Val	420	425		430
45	Thr Leu Gly Asp Thr Val Thr Phe Thr Pro Gln Trp Ser Ala Met Phe	435	440		445
50					

Tyr Leu Ser Gln Ser Trp Leu Gln Thr Lys Asn Tyr Asp Lys His
 Gly
 450 455 460

5
 Asn Gln Thr Asn Gln Val Asp Glu Asn Gly Leu Ser Pro Asn Ala
 Ala
 465 470 475
 480

10
 Leu Met Tyr Lys Ile Thr Pro Asn Thr Met Ala Tyr Val Ser Tyr
 Ala
 485 490 495

15
 Asp Ser Leu Glu Gln Gly Gly Thr Ala Pro Thr Asp Glu Ser Val
 Lys
 500 505 510

20
 Asn Ala Gly Gln Thr Leu Asn Pro Tyr Arg Ser Lys Gln Tyr Glu
 Val
 515 520 525

25
 Gly Leu Lys Ser Asp Ile Gly Glu Met Asn Leu Gly Ala Ala Leu
 Phe
 530 535 540

30
 Arg Leu Glu Arg Pro Phe Ala Tyr Leu Asp Thr Asp Asn Val Tyr
 Lys
 545 550 555
 560

35
 Glu Gln Gly Asn Gln Val Asn Asn Gly Leu Glu Leu Thr Ala Ala
 Gly
 565 570 575

40
 Asn Val Trp Gln Gly Leu Asn Ile Tyr Ser Gly Val Thr Phe Leu
 Asp
 580 585 590

45
 Pro Lys Leu Lys Asp Thr Ala Asn Ala Ser Thr Ser Asn Lys Gln
 Val
 595 600 605

50

Val Gly Val Pro Lys Val Gln Ala Asn Leu Leu Ala Glu Tyr Ser
 Leu
 610 615 620
 5

Pro Ser Ile Pro Glu Trp Val Tyr Ser Ala Asn Val His Tyr Thr
 Gly
 625 630 635
 10 640

Lys Arg Ala Ala Asn Asp Thr Asn Thr Ser Tyr Ala Ser Ser Tyr
 Thr
 15 645 650 655

Thr Trp Asp Leu Gly Thr Arg Tyr Thr Thr Lys Val Ser Asn Val
 Pro
 20 660 665 670

Thr Thr Phe Arg Val Val Val Asn Asn Val Phe Asp Lys His Tyr
 Trp
 25 675 680 685

Ala Ser Ile Phe Pro Ser Gly Thr Asp Gly Asp Asn Gly Ser Pro
 Ser
 30 690 695 700

Ala Phe Ile Gly Gly Gly Arg Glu Val Arg Ala Ser Val Thr Phe
 Asp
 35 705 710 715
 720

Phe
 40

<210> 50 <211> 669 <212> PRT <213> Escherichia coli <400>
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 45

Met Lys Asn Ile Thr Leu Trp Gln Arg Leu Arg Gln Val Ser Ile
 Ser
 1 5 10 15
 50

Thr Ser Leu Arg Cys Ala Phe Leu Met Gly Ala Leu Leu Thr Leu
 Ile
 20 25 30

5
 Val Ser Ser Val Ser Leu Tyr Ser Trp His Glu Gln Ser Ser Gln
 Ile
 35 40 45

10
 Arg Tyr Ser Leu Asp Lys Tyr Phe Pro Arg Ile His Ser Ala Phe
 Leu
 50 55 60

15
 Ile Glu Gly Asn Leu Asn Leu Val Val Asp Gln Leu Asn Glu Phe
 Leu
 65 70 75 80

20
 Gln Ala Pro Asn Thr Thr Val Arg Leu Gln Leu Arg Thr Gln Ile
 Ile
 85 90 95

25
 Gln His Leu Asp Thr Ile Glu Arg Leu Ser Arg Gly Leu Ser Ser
 Arg
 100 105 110

30
 Glu Arg Gln Gln Leu Thr Val Ile Leu Gln Asp Ser Arg Ser Leu
 Leu
 115 120 125

35
 Ser Glu Leu Asp Arg Ala Leu Tyr Asn Met Phe Leu Leu Arg Glu
 Lys
 130 135 140

40
 Val Ser Glu Leu Ser Ala Arg Ile Asp Trp Leu His Asp Asp Phe
 Thr
 145 150 155
 160

45
 Thr Glu Leu Asn Ser Leu Val Gln Asp Phe Thr Trp Gln Gln Gly
 Thr
 165 170 175

50

Leu Leu Asp Gln Ile Ala Ser Arg Gln Gly Asp Thr Ala Gln Tyr
 Leu
 180 185 190

5
 Lys Arg Ser Arg Glu Val Gln Asn Glu Gln Gln Gln Val Tyr Thr
 Leu
 195 200 205

10
 Ala Arg Ile Glu Asn Gln Ile Val Asp Asp Leu Arg Asp Arg Leu
 Asn
 210 215 220

15
 Glu Leu Lys Ser Gly Arg Asp Asp Asp Ile Gln Val Glu Thr His
 Leu
 225 230 235
 240

20
 Arg Tyr Phe Glu Asn Leu Lys Lys Thr Ala Asp Glu Asn Ile Arg
 Met
 245 250 255

25
 Leu Asp Asp Trp Pro Gly Thr Ile Thr Leu Arg Gln Thr Ile Asp
 Glu
 260 265 270

30
 Leu Leu Asp Met Gly Ile Val Lys Asn Lys Met Pro Asp Thr Met
 Arg
 275 280 285

35
 Glu Tyr Val Ala Ala Gln Lys Ala Leu Glu Asp Ala Ser Arg Thr
 Arg
 290 295 300

40
 Glu Ala Thr Gln Gly Arg Phe Arg Thr Leu Leu Glu Ala Gln Leu
 Gly
 305 310 315
 320

45
 Ser Thr His Gln Gln Met Gln Met Phe Asn Gln Arg Met Glu Gln
 Ile
 325 330 335

50

	Val His Val Ser Gly Gly Leu Ile Leu Val Ala Thr Ala Leu Ala		
	Leu		
5	340	345	350
	Leu Leu Ala Trp Val Phe Asn His Tyr Phe Ile Arg Ser Arg Leu		
	Val		
10	355	360	365
	Lys Arg Phe Thr Leu Leu Asn Gln Ala Val Val Gln Ile Gly Leu		
	Gly		
15	370	375	380
	Gly Thr Glu Thr Thr Ile Pro Val Tyr Gly Asn Asp Glu Leu Gly		
	Arg		
20	385	390	395
	400		
	Ile Ala Gly Leu Leu Arg His Thr Leu Gly Gln Leu Asn Val Gln		
	Lys		
25	405	410	415
	Gln Gln Leu Glu Gln Glu Ile Thr Asp Arg Lys Val Ile Glu Ala		
	Asp		
30	420	425	430
	Leu Arg Ala Thr Gln Asp Glu Leu Ile Gln Thr Ala Lys Leu Ala		
	Val		
35	435	440	445
	Val Gly Gln Thr Met Thr Thr Leu Ala His Glu Ile Asn Gln Pro		
	Leu		
40	450	455	460
	Asn Ala Leu Ser Met Tyr Leu Phe Thr Ala Arg Arg Ala Ile Glu		
	Gln		
45	465	470	475
	480		
	Thr Gln Lys Glu Gln Ala Ser Met Met Leu Gly Lys Ala Glu Gly		
	Val		
50	485	490	495

5	Ile Ser Arg Ile Asp Ala Ile Ile Arg Ser Leu Arg Gln Phe Thr Arg	500	505	510
10	Arg Ala Glu Leu Glu Thr Ser Leu His Ala Val Asp Leu Ala Gln Met	515	520	525
15	Phe Ser Ala Ala Trp Glu Leu Leu Ala Met Arg His Arg Ser Leu Gln	530	535	540
20	Ala Thr Leu Val Leu Pro Gln Gly Thr Ala Thr Val Ser Gly Asp Glu	545	550	555
	560			
25	Val Arg Thr Gln Gln Val Leu Val Asn Val Leu Ala Asn Ala Leu Asp	565	570	575
30	Val Cys Gly Gln Gly Ala Val Ile Thr Val Asn Trp Gln Met Gln Gly	580	585	590
35	Lys Thr Leu Asn Val Phe Ile Gly Asp Asn Gly Pro Gly Trp Pro Glu	595	600	605
40	Ala Leu Leu Pro Ser Leu Leu Lys Pro Phe Thr Thr Ser Lys Glu Val	610	615	620
45	Gly Leu Gly Ile Gly Leu Ser Ile Cys Val Ser Leu Met Glu Gln Met	625	630	635
	640			
50	Lys Gly Glu Leu Arg Leu Ala Ser Thr Met Thr Arg Asn Ala Cys Val			

645

650

655

5 Val Leu Gln Phe Arg Leu Thr Asp Val Glu Asp Ala Lys
660 665

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10 Met Asn Val Ile Lys Leu Ala Ile Gly Ser Gly Ile Leu Leu Leu
Ser
1 5 10 15

15 Cys Gly Ala Tyr Ser Gln Ser Ile Ser Glu Lys Thr Asn Ser Asp
Lys
20 25 30

20 Lys Gly Ala Ala Glu Phe Ser Pro Leu Ser Val Ser Val Gly Lys
Thr
35 40 45

25 Thr Ser Glu Gln Glu Ala Leu Glu Lys Thr Gly Ala Thr Ser Ser
Arg
50 55 60

30 Thr Thr Asp Lys Asn Leu Gln Ser Leu Asp Ala Thr Val Arg Ser
Met
65 70 75 80

35 Pro Gly Thr Tyr Thr Gln Ile Asp Pro Gly Gln Gly Ala Ile Ser
Val
85 90 95

40 Asn Ile Arg Gly Met Ser Gly Phe Gly Arg Val Asn Thr Met Val
Asp
100 105 110

45 Gly Ile Thr Gln Ser Phe Tyr Gly Thr Ser Thr Ser Gly Thr Thr
Thr
115 120 125

50

	His Gly Ser Thr Asn Asn Met Ala Gly Val Leu Ile Asp Pro Asn Leu		
	130	135	140
5	Leu Val Ala Val Asp Val Thr Arg Gly Asp Ser Ser Gly Ser Glu Gly		
	145	150	155
	160		
10	Ile Asn Ala Leu Ala Gly Ser Ala Asn Met Arg Thr Ile Gly Val Asp		
	165	170	175
15	Asp Val Ile Phe Asn Gly Asn Thr Tyr Gly Leu Arg Ser Arg Phe Ser		
	180	185	190
20	Val Gly Ser Asn Gly Leu Gly Arg Ser Gly Met Ile Ala Leu Gly Gly		
	195	200	205
25	Lys Ser Asp Ala Phe Thr Asp Thr Gly Ser Ile Gly Val Met Ala Ala		
	210	215	220
30	Val Ser Gly Ser Ser Val Tyr Ser Asn Phe Ser Asn Gly Ser Gly Ile		
	225	230	235
35	240		
	Asn Ser Lys Glu Phe Gly Tyr Asp Lys Tyr Met Lys Gln Asn Pro Lys		
	245	250	255
40	Ser Gln Leu Tyr Lys Met Asp Ile Arg Pro Asp Glu Phe Asn Ser Phe		
	260	265	270
45	Glu Leu Ser Ala Arg Thr Tyr Glu Asn Lys Phe Thr Arg Arg Asp Ile		
	275	280	285
50			

Thr Ser Asp Asp Tyr Tyr Ile Lys Tyr His Tyr Thr Pro Phe Ser
 Glu
 290 295 300
 5

Leu Ile Asp Phe Asn Val Thr Ala Ser Thr Ser Arg Gly Asn Gln
 Lys
 305 310 315
 10 320

Tyr Arg Asp Gly Ser Leu Tyr Thr Phe Tyr Lys Thr Ser Ala Gln
 Asn
 15 325 330 335

Arg Ser Asp Ala Leu Asp Ile Asn Asn Thr Ser Arg Phe Thr Val
 Ala
 20 340 345 350

Asp Asn Asp Leu Glu Phe Met Leu Gly Ser Lys Leu Met Arg Thr
 Arg
 25 355 360 365

Tyr Asp Arg Thr Ile His Ser Ala Ala Gly Asp Pro Lys Ala Asn
 Gln
 30 370 375 380

Glu Ser Ile Glu Asn Asn Pro Phe Ala Pro Ser Gly Gln Gln Asp
 Ile
 35 385 390 395
 400

Ser Ala Leu Tyr Thr Gly Leu Lys Val Thr Arg Gly Ile Trp Glu
 Ala
 40 405 410 415

Asp Phe Asn Leu Asn Tyr Thr Arg Asn Arg Ile Thr Gly Tyr Lys
 Pro
 45 420 425 430

Ala Cys Asp Ser Arg Val Ile Cys Val Pro Gln Gly Ser Tyr Asp
 Ile
 50 435 440 445

5	Asp Gln	Asp	Lys	Glu	Gly	Gly	Phe	Asn	Pro	Ser	Val	Gln	Leu	Ser	Ala	
		450					455					460				
10	Val Arg 465 480	Thr	Pro	Trp	Leu	Gln	Pro	Phe	Ile	Gly	Tyr	Ser	Lys	Ser	Met	
						470					475					
15	Ala Ser	Pro	Asn	Ile	Gln	Glu	Met	Phe	Phe	Ser	Asn	Ser	Gly	Gly	Ala	
					485					490					495	
20	Met Gly	Asn	Pro	Phe	Leu	Lys	Pro	Glu	Arg	Ala	Glu	Thr	Trp	Gln	Ala	
					500				505					510		
25	Phe Arg	Asn	Ile	Asp	Thr	Arg	Asp	Leu	Leu	Val	Glu	Gln	Asp	Ala	Leu	
				515				520					525			
30	Phe Ser	Lys	Ala	Leu	Ala	Tyr	Arg	Ser	Arg	Ile	Gln	Asn	Tyr	Ile	Tyr	
		530					535					540				
35	Glu Glu 545 560	Ser	Tyr	Leu	Val	Cys	Ser	Gly	Gly	Arg	Lys	Cys	Ser	Leu	Pro	
						550					555					
40	Val Asn	Ile	Gly	Asn	Gly	Trp	Glu	Gly	Ile	Ser	Asp	Glu	Tyr	Ser	Asp	
					565					570					575	
45	Met Phe	Tyr	Ile	Tyr	Val	Asn	Ser	Ala	Ser	Asp	Val	Ile	Ala	Lys	Gly	
					580					585				590		
50	Glu Ser	Leu	Glu	Met	Asp	Tyr	Asp	Ala	Gly	Phe	Ala	Phe	Gly	Arg	Leu	

	595	600	605
5	Phe Ser Gln Gln Gln Thr Asp Gln Pro Thr Ser Ile Ala Ser Thr His		
	610	615	620
10	Phe Gly Ala Gly Asp Ile Thr Glu Leu Pro Arg Lys Tyr Met Thr Leu		
	625	630	635
	640		
15	Asp Thr Gly Val Arg Phe Phe Asp Asn Ala Leu Thr Leu Gly Thr Ile		
	645	650	655
20	Ile Lys Tyr Thr Gly Lys Ala Arg Arg Leu Ser Pro Asp Phe Glu Gln		
	660	665	670
25	Asp Glu His Thr Gly Ala Ile Ile Lys Gln Asp Leu Pro Gln Ile Pro		
	675	680	685
30	Thr Ile Ile Asp Leu Tyr Gly Thr Tyr Glu Tyr Asn Arg Asn Leu Thr		
	690	695	700
35	Leu Lys Leu Ser Val Gln Asn Leu Met Asn Arg Asp Tyr Ser Glu Ala		
	705	710	715
	720		
40	Leu Asn Lys Leu Asn Met Met Pro Gly Leu Gly Asp Glu Thr His Pro		
	725	730	735
45	Ala Asn Ser Ala Arg Gly Arg Thr Trp Ile Phe Gly Gly Asp Ile Arg		
	740	745	750
50	Phe		

5 <210> 52 <211> 133 <212> PRT <213> Escherichia coli <400>
 52
 Met Ser Ser Lys Thr Lys Cys Trp Leu Trp Met Leu Leu Val Ile
 Leu
 1 5 10 15
 10
 Ser Glu Thr Ser Ala Thr Ser Thr Leu Lys Met Phe Asp Asn Ser
 Glu
 20 25 30
 15
 Gly Met Thr Lys Thr Leu Leu Leu Ala Leu Ile Val Val Leu Tyr
 Cys
 35 40 45
 20
 Ile Cys Tyr Tyr Ser Leu Ser Arg Ala Val Lys Asp Ile Pro Val
 Gly
 50 55 60
 25
 Leu Ala Tyr Ala Thr Trp Ser Gly Thr Gly Ile Leu Met Val Ser
 Thr
 65 70 75 80
 30
 Leu Gly Ile Leu Phe Tyr Gly Gln His Pro Asp Thr Ala Ala Ile
 Ile
 85 90 95
 35
 Gly Met Val Ile Ile Ala Ser Gly Ile Ile Ile Met Asn Leu Phe
 Ser
 100 105 110
 40
 Lys Met Gly Ser Glu Glu Ala Glu Glu Thr Pro Val Thr Asn Leu
 Asp
 115 120 125
 45
 Lys Lys Ile Ala Asn
 130
 50

<210> 53 <211> 286 <212> PRT <213> Escherichia coli <400>
53

5	Met Tyr Ile Lys Lys His Trp Ile Ala Leu Ser Ile Leu Leu Ile Pro 1	5	10	15
10	Cys Ile Gly Asn Ala Gln Glu Ile Lys Ile Asp Glu Ser Trp Leu His	20	25	30
15	Gln Ser Leu Asn Val Ile Gly Arg Thr Asp Ser Arg Phe Gly Pro Arg	35	40	45
20	Leu Thr Asn Asp Leu Tyr Pro Glu Tyr Thr Val Ala Gly Arg Lys Asp	50	55	60
25	Trp Phe Asp Phe Tyr Gly Tyr Val Asp Leu Pro Lys Phe Phe Gly Val	65	70	75
				80
30	Gly Ser His Tyr Asp Val Gly Ile Trp Asp Glu Gly Ser Pro Leu Phe	85	90	95
35	Thr Glu Ile Glu Pro Arg Phe Ser Ile Asp Lys Leu Thr Gly Leu Asn	100	105	110
40	Leu Ala Phe Gly Pro Phe Lys Glu Trp Phe Ile Ala Asn Asn Tyr Val	115	120	125
45	Tyr Asp Met Gly Asp Asn Gln Ser Ser Arg Gln Ser Thr Trp Tyr Met	130	135	140
50	Gly Leu Gly Thr Asp Ile Asp Thr Gly Leu Pro Ile Lys Leu Ser Ala			

145		150		155
160				
5	Asn Ile Tyr Ala Lys Tyr Gln Trp Gln Asn Tyr Gly Ala Ala Asn Glu	165	170	175
10	Asn Glu Trp Asp Gly Tyr Arg Phe Lys Ile Lys Tyr Ser Ile Pro Leu	180	185	190
15	Thr Asn Leu Phe Gly Gly Arg Leu Val Tyr Asn Ser Phe Thr Asn Phe	195	200	205
20	Asp Phe Gly Ser Asp Leu Ala Asp Lys Ser His Asn Asn Lys Arg Thr	210	215	220
25	Ser Asn Ala Ile Ala Ser Ser His Ile Leu Ser Leu Leu Tyr Glu His 225 240	230	235	
30	Trp Lys Phe Ala Phe Thr Leu Arg Tyr Phe His Asn Gly Gly Gln Trp	245	250	255
35	Asn Ala Gly Glu Lys Val Asn Phe Gly Asp Gly Pro Phe Glu Leu Lys	260	265	270
40	Asn Thr Gly Trp Gly Thr Tyr Thr Thr Ile Gly Tyr Gln Phe 275	280	285	
45	<210> 54 <211> 172 <212> PRT <213> Escherichia coli <400> 54			
	Met Arg Ile Ala Pro Arg Thr Phe Phe Ala Ile Ser Ala Leu Ala Phe			
50	1	5	10	15

	Ile Val Ala Ser Gly Phe Ser Phe Trp Arg Leu Ser Pro Ala Glu	
	Asn	
5	20	25 30
	Thr Gly Ile Met Ser Cys Ser Thr Lys Gly Ile Met Arg Phe Glu	
	Asn	
10	35	40 45
	Met Glu Lys Glu Asn Val Asn Gly Asn Ile His Phe Asn Phe Gly	
	Ser	
15	50	55 60
	Gln Gly Lys Gly Ser Met Val Leu Glu Gly Tyr Thr Asp Ser Ala	
	Ala	
20	65	70 75 80
	Gly Trp Leu Tyr Leu Gln Arg Tyr Val Lys Phe Thr Tyr Thr Ser	
	Lys	
25	85	90 95
	Arg Val Ser Ala Thr Glu Arg His Tyr Arg Ile Ser Gln Trp Glu	
	Ser	
30	100	105 110
	Ser Ala Ser Ser Ile Asp Glu Ser Pro Asp Val Ile Phe Asp Tyr	
	Phe	
35	115	120 125
	Met Arg Glu Met Ser Asp Ser His Asp Gly Leu Phe Leu Asn Ala	
	Gln	
40	130	135 140
	Lys Leu Asn Asp Lys Ala Ile Leu Leu Ser Ser Ile Asn Ser Pro	
	Leu	
45	145	150 155
	160	
	Trp Ile Cys Thr Leu Lys Ser Gly Ser Lys Leu Asp	
50	165	170

<210> 55 <211> 182 <212> PRT <213> Escherichia coli <400>
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 Met Lys Ile Lys Val Ile Ala Leu Ala Thr Phe Val Ser Ala Val
 5 Phe
 1 5 10 15
 Ala Gly Ser Ala Met Ala Tyr Asp Gly Thr Ile Thr Phe Thr Gly
 10 Lys
 20 25 30
 Val Val Ala Gln Thr Cys Thr Val Asn Thr Ser Asp Lys Asp Leu
 15 Ala
 35 40 45
 Val Thr Leu Pro Thr Val Ala Thr Ser Ser Leu Lys Asp Asn Ala
 20 Ala
 50 55 60
 Thr Ser Gly Leu Thr Pro Phe Ala Ile Arg Leu Thr Gly Cys Ala
 25 Thr
 65 70 75 80
 Gly Met Asn Ser Ala Gln Asn Val Lys Ala Tyr Phe Glu Pro Ser
 30 Ser
 85 90 95
 Asn Ile Asp Leu Ala Thr His Asn Leu Lys Asn Thr Ala Thr Pro
 35 Thr
 100 105 110
 Lys Ala Asp Asn Val Gln Ile Gln Leu Leu Asn Ser Asn Gly Thr
 40 Ser
 115 120 125
 Thr Ile Leu Leu Gly Glu Ala Asp Asn Gly Gln Asp Val Gln Ser
 45 Glu
 130 135 140
 Thr Ile Gly Ser Asp Gly Ser Ala Thr Leu Arg Tyr Met Ala Gln
 50 Tyr

145
 160

150

155

5 Tyr Ala Thr Gly Gln Ser Thr Ala Gly Asp Val Lys Ala Thr Val
 His

165 170 175

10 Tyr Thr Ile Ala Tyr Glu
 180

15 <210> 56 <211> 359 <212> PRT <213> Escherichia coli <400>
 56

Met Lys Arg Ile Phe Phe Ile Pro Leu Phe Leu Ile Leu Leu Pro
 Lys
 1 5 10 15

20 Leu Ala Val Ala Gly Pro Asp Asp Tyr Val Pro Ser Gln Ile Ala
 Val
 20 25 30

25 Asn Thr Ser Thr Leu Pro Gly Val Val Ile Gly Pro Ala Asp Ala
 His
 35 40 45

30 Thr Tyr Pro Arg Val Ile Gly Glu Leu Ala Gly Thr Ser Asn Gln
 Tyr
 50 55 60

35 Val Phe Asn Gly Gly Ala Ile Ala Leu Met Arg Gly Lys Phe Thr
 Pro
 65 70 75 80

40 Ala Leu Pro Lys Ile Gly Ser Ile Thr Val Tyr Phe Pro Ser Arg
 Lys
 85 90 95

45 Gln Arg Asp Ser Ser Asp Phe Asp Ile Tyr Asp Ile Gly Val Ser
 Gly
 100 105 110

50

	Leu	Gly	Ile	Ile	Ile	Gly	Met	Ala	Gly	Tyr	Trp	Pro	Ala	Thr	Pro	
	Leu															
			115					120					125			
5	Val	Pro	Ile	Asn	Ser	Ser	Gly	Ile	Tyr	Ile	Asp	Pro	Val	Gly	Ala	
	Asn															
		130					135					140				
10	Thr	Asn	Pro	Asn	Thr	Tyr	Asn	Gly	Ala	Thr	Ala	Ser	Phe	Gly	Ala	
	Arg															
	145						150					155				
	160															
15																
	Leu	Phe	Val	Ala	Phe	Val	Ala	Thr	Gly	Arg	Leu	Pro	Asn	Gly	Tyr	
	Ile															
				165						170					175	
20																
	Thr	Ile	Pro	Thr	Arg	Gln	Leu	Gly	Thr	Ile	Leu	Leu	Glu	Ala	Lys	
	Arg															
				180					185					190		
25																
	Thr	Ser	Leu	Asn	Asn	Lys	Gly	Leu	Thr	Ala	Pro	Val	Met	Leu	Asn	
	Gly															
			195					200					205			
30																
	Gly	Arg	Ile	Gln	Val	Gln	Ser	Gln	Thr	Cys	Thr	Met	Gly	Gln	Lys	
	Asn															
		210					215					220				
35																
	Tyr	Val	Val	Pro	Leu	Asn	Thr	Val	Tyr	Gln	Ser	Gln	Phe	Thr	Ser	
	Leu															
	225					230					235					
40	240															
	Tyr	Lys	Glu	Ile	Gln	Gly	Gly	Lys	Ile	Asp	Ile	His	Leu	Gln	Cys	
	Pro															
45																
				245					250					255		
	Asp	Gly	Ile	Asp	Val	Tyr	Ala	Thr	Leu	Thr	Asp	Ala	Ser	Gln	Pro	
	Val															
50																
			260						265					270		

Asn Arg Thr Asp Ile Leu Thr Leu Ser Ser Glu Ser Thr Ala Lys
 Gly
 275 280 285
 5

Phe Gly Ile Arg Leu Tyr Lys Asp Ser Asp Val Thr Ala Ile Ser
 Tyr
 290 295 300
 10

Gly Glu Asp Ser Pro Val Lys Gly Asn Gly Ser Gln Trp His Phe
 Ser
 305 310 315
 15 320

Asp Tyr Arg Gly Glu Val Asn Pro His Ile Asn Leu Arg Ala Asn
 Tyr
 325 330 335
 20

Ile Lys Ile Ala Asp Ala Thr Thr Pro Gly Ser Val Lys Ala Ile
 Ala
 340 345 350
 25

Thr Ile Thr Phe Ser Tyr Gln
 355
 30

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Met Asn Ala Asn Asn Leu Ser Cys Leu Ile Tyr Cys Arg Cys Ser
 Leu
 1 5 10 15
 35

Leu Leu Phe Ala Ala Leu Gly Leu Thr Val Thr Asn His Ser Phe
 Ala
 20 25 30
 40

Ala Glu Glu Ala Glu Phe Asp Ser Glu Phe Leu His Leu Asp Lys
 Gly
 35 40 45
 45

Ile Asn Ala Ile Asp Ile Arg Arg Phe Ser His Gly Asn Pro Val
 Pro
 50

	50		55		60	
5	Glu Gly Arg Tyr Tyr Ser Asp Ile Tyr Val Asn Asn Val Trp Lys					
	Gly					
	65	70		75		80
10	Lys Ala Asp Leu Gln Tyr Leu Arg Thr Ala Asn Thr Gly Ala Pro					
	Thr					
		85		90		95
15	Leu Cys Leu Thr Pro Glu Leu Leu Ser Leu Ile Asp Leu Val Lys					
	Asp					
		100		105		110
20	Thr Met Ser Gly Asn Thr Ser Cys Phe Pro Ala Ser Thr Gly Leu					
	Ser					
		115		120		125
25	Ser Ala Arg Ile Asn Phe Asp Leu Ser Thr Leu Arg Leu Asn Ile					
	Glu					
		130		135		140
30	Ile Pro Gln Ala Leu Leu Asn Thr Arg Pro Arg Gly Tyr Ile Ser					
	Pro					
			145		155	
			150			
			160			
35	Ala Gln Trp Gln Ser Gly Val Pro Ala Ala Phe Ile Asn Tyr Asp					
	Ala					
		165		170		175
40	Asn Tyr Tyr Gln Tyr Ser Ser Ser Gly Thr Ser Asn Glu Gln Thr					
	Tyr					
		180		185		190
45	Leu Gly Leu Lys Ala Gly Phe Asn Leu Trp Gly Trp Ala Leu Arg					
	His					
		195		200		205
50	Arg Gly Ser Glu Ser Trp Asn Asn Ser Tyr Pro Ala Gly Tyr Gln					
	Asn					

	210	215	220
5	Ile Glu Thr Ser Ile Met His Asp Leu Ala Pro Leu Arg Ala Gln Phe 225 240	230	235
10	Thr Leu Gly Asp Phe Tyr Thr Asn Gly Glu Leu Met Asp Ser Leu Ser 245	250	255
15	Leu Arg Gly Val Arg Leu Ala Ser Asp Glu Arg Met Leu Pro Gly Ser 260	265	270
20	Leu Arg Gly Tyr Ala Pro Ala Val Arg Gly Ile Ala Asn Ser Asn Ala 275	280	285
25	Lys Val Thr Ile Tyr Gln Asn Ala His Ile Leu Tyr Glu Thr Thr Val 290	295	300
30	Pro Ala Gly Pro Phe Val Ile Asn Asp Leu Tyr Pro Ser Gly Tyr Ala 305 320	310	315
35	Gly Asp Leu Leu Val Lys Ile Thr Glu Ser Asn Gly Gln Thr Arg Met 325	330	335
40	Phe Thr Val Pro Phe Ala Ala Val Ala Gln Leu Ile Arg Pro Gly Phe 340	345	350
45	Ser Arg Trp Gln Met Ser Val Gly Lys Tyr Arg Tyr Ala Asn Lys Thr 355	360	365
50			

	Tyr	Asn	Asp	Leu	Ile	Ala	Gln	Gly	Thr	Tyr	Gln	Tyr	Gly	Leu	Thr
	Asn														
		370					375					380			
5	Asp	Ile	Thr	Leu	Asn	Ser	Gly	Leu	Thr	Thr	Ala	Ser	Gly	Tyr	Thr
	Ala														
	385					390					395				
	400														
10	Gly	Leu	Ala	Gly	Leu	Ala	Phe	Asn	Thr	Pro	Leu	Gly	Ala	Ile	Ala
	Ser														
					405					410					415
15	Asp	Ile	Thr	Leu	Ser	Arg	Thr	Ala	Phe	Arg	Tyr	Ser	Gly	Val	Thr
	Arg														
				420					425					430	
20	Lys	Gly	Tyr	Ser	Leu	His	Ser	Ser	Tyr	Ser	Ile	Asn	Ile	Pro	Ala
	Ser														
			435					440					445		
25	Asn	Thr	Asn	Ile	Thr	Leu	Ala	Ala	Tyr	Arg	Tyr	Ser	Ser	Lys	Asp
	Phe														
		450					455					460			
30	Tyr	His	Leu	Lys	Asp	Ala	Leu	Ser	Ala	Asn	His	Asn	Ala	Phe	Ile
	Asp														
	465					470					475				
35	480														
	Asp	Val	Ser	Val	Lys	Ser	Thr	Ala	Phe	Tyr	Arg	Pro	Arg	Asn	Gln
	Phe														
40					485					490					495
	Gln	Ile	Ser	Ile	Asn	Gln	Glu	Leu	Gly	Glu	Lys	Trp	Gly	Gly	Met
	Tyr														
45				500					505					510	
	Leu	Thr	Gly	Thr	Thr	Tyr	Asn	Tyr	Trp	Gly	His	Lys	Gly	Ser	Arg
	Asn														
50			515					520					525		

	Glu Tyr Gln Ile Gly Tyr Ser Asn Phe Trp Lys Gln Leu Gly Tyr	
	Gln	
	530	535 540
5		
	Ile Gly Leu Ser Gln Ser Arg Asp Asn Glu Gln Gln Arg Arg Asp	
	Asp	
	545	550 555
10	560	
	Arg Phe Tyr Ile Asn Phe Thr Leu Pro Leu Gly Gly Ser Val Gln	
	Ser	
15		565 570 575
	Pro Val Phe Ser Thr Val Leu Asn Tyr Ser Lys Glu Glu Lys Asn	
	Ser	
20		580 585 590
	Ile Gln Thr Ser Ile Ser Gly Thr Gly Gly Glu Asp Asn Gln Phe	
	Ser	
25		595 600 605
	Tyr Gly Ile Ser Gly Asn Ser Gln Glu Asn Gly Pro Ser Gly Tyr	
	Ala	
30		610 615 620
	Met Asn Gly Gly Tyr Arg Ser Pro Tyr Val Asn Ile Thr Thr Thr	
	Val	
35		625 630 635
	640	
	Gly His Asp Thr Gln Asn Asn Asn Gln Arg Ser Phe Gly Ala Ser	
	Gly	
40		645 650 655
	Ala Val Val Ala His Pro Tyr Gly Val Thr Leu Ser Asn Asp Leu	
	Ser	
45		660 665 670
	Asp Thr Phe Ala Ile Ile His Ala Glu Gly Ala Gln Gly Ala Val	
	Ile	
50		675 680 685

5	Asn Val	Asn	Ala	Ser	Gly	Ser	Arg	Leu	Asp	Phe	Trp	Gly	Asn	Gly	Val	
		690						695							700	
10	Pro Ser	Tyr	Val	Thr	Pro	Tyr	Glu	Lys	Asn	Gln	Ile	Ser	Ile	Asp	Pro	
		705						710						715		
		720														
15	Asn Ile	Leu	Asp	Leu	Asn	Val	Glu	Leu	Ser	Ala	Thr	Glu	Gln	Glu	Ile	
								725						730		735
20	Pro Gly	Arg	Ala	Asn	Ser	Ala	Thr	Leu	Val	Lys	Phe	Asp	Thr	Lys	Thr	
								740						745		750
25	Arg Pro	Ser	Leu	Leu	Phe	Asp	Ile	Arg	Met	Ser	Thr	Gly	Asn	Pro	Pro	
								755						760		765
30	Met Val	Ala	Ser	Glu	Val	Leu	Asp	Glu	His	Gly	Gln	Leu	Ala	Gly	Tyr	
								770						775		780
35	Ala His	Gln	Ala	Gly	Lys	Val	Phe	Thr	Arg	Gly	Leu	Pro	Glu	Lys	Gly	
														785		790
																795
														800		
40	Leu Val	Ser	Val	Val	Trp	Gly	Pro	Asp	Asn	Lys	Asp	Arg	Cys	Ser	Phe	
														805		810
																815
45	Tyr Pro	His	Val	Ala	His	Asn	Lys	Asp	Asp	Met	Gln	Ser	Gln	Leu	Val	
														820		825
																830
50	Val	Leu	Cys	Ile	Gln	His	Pro	Asn	Gln	Glu	Lys	Thr				
														835		840

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58

5 Met Val Lys Cys His Thr Leu Ile Asn Arg Arg Asn Lys Cys Leu
Leu
1 5 10 15

10 Ile Val Phe Ile Val Leu Ile Gly Trp Ile Ile Phe Arg Pro Lys
Ala
20 25 30

15 Tyr Thr Tyr Ser Leu Asn Asp Lys Glu Lys Glu Met Leu Ile Met
Leu
35 40 45

20 Ser Gln His Pro Glu Thr Arg Tyr Phe Gly Phe Tyr Ser Ile Glu
Leu
50 55 60

25 Pro Ala Asp Tyr Lys Pro Thr Gly Met Val Met Phe Ile Gln Gly
Ser
65 70 75 80

30 Ala Met Ile Pro Val Glu Thr Lys Leu Gln Tyr Tyr Pro Pro Phe
Leu
85 90 95

35 Gln Tyr Met Thr Arg Tyr Glu Ala Glu Leu Lys Asn Thr Ser Ala
Leu
100 105 110

40 Asp Pro Leu Asp Thr Pro Tyr Leu Lys Gln Val His Pro Leu Ser
Pro
115 120 125

45 Pro Met Asn Gly Val Ile Phe Glu Arg Met Lys Ala Lys Tyr Thr
Pro
130 135 140

50

Asp Phe Ala Arg Val Leu Asp Ala Trp Lys Trp Glu Asn Gly Val
 Thr
 145 150 155
 160
 5
 Phe Ser Val Lys Ile Glu Ala Lys Asp Gly Arg Ala Thr Arg Tyr
 Asp
 165 170 175
 10
 Gly Ile Ser Lys Ile Ala Glu Tyr Ser Tyr Gly Tyr Asn Ile Pro
 Glu
 180 185 190
 15
 Lys Lys Val Gln Leu Leu Thr Ile Leu Ser Gly Leu Gln Pro Arg
 Ala
 195 200 205
 20
 Asp Asn Gln Pro Pro Ser Glu Asn Lys Leu Ala Ile Gln Tyr Ala
 Gln
 210 215 220
 25
 Val Asp Ala Ser Leu Leu Gly Glu Tyr Glu Leu Ser Val Asp Tyr
 Lys
 225 230 235
 30
 240
 Asn Ser Asn Asn Ile Lys Ile Ser Leu Gln Thr Asp Asn Asn Ser
 Tyr
 245 250 255
 35
 Ile Asp Ser Leu Leu Asp Ile Arg Tyr Pro Ser Asn Gly Asn Arg
 Ala
 260 265 270
 40
 Trp Tyr Asn Ser Ile
 275
 45
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 59
 50 Met Leu Pro Glu Pro Val Tyr Arg Arg Trp Ile Ile Leu Leu Ile
 Ser

1		5		10		15
5	Met Leu Thr Val Gly Thr Leu Phe Ile Leu Ser Val Trp Asn Ser					
	Ala	20		25		30
10	Thr Tyr Trp Asp Ile Phe Ile Tyr Gly Val Leu Pro Met Leu Phe					
	Leu	35		40		45
15	Trp Leu Cys Leu Phe Gly Ile Ala Leu Asn Lys Tyr Glu Gln Ser					
	Val	50		55		60
20	Ala Ala Cys Ile Ser Trp Glu Ser Glu Arg Gln Gln Val Lys Gln					
	Leu	65		70		75
						80
25	Trp Gln His Trp Ser Gln Lys Gln Leu Ala Ile Val Gly Asn Val					
	Leu	85		90		95
30	Phe Thr Pro Glu Glu Lys Gly Met Ser Val Leu Leu Gly Pro Gln					
	Glu	100		105		110
35	Glu Ile Pro Ala Tyr Pro Lys Lys Ala Arg Pro Leu Phe Ser Ala					
	Ser	115		120		125
40	Arg Tyr Ser Leu Ser Ser Ile Phe His Asp Ile His Gln Gln Leu					
	Thr	130		135		140
45	Gln Gln Phe Pro Asp Tyr Arg His Tyr Leu His Thr Ile Tyr Val					
	Leu	145		150		155
		160				
50	Gln Pro Glu Lys Trp Arg Gly Glu Thr Val Arg Gln Ala Ile Phe					
	His					

		165		170		175
5	Gln Trp Asp Leu Val Pro Glu Arg Thr Asn Thr Leu Asn Gln Ile Gln	180		185		190
10	Ser Leu Tyr Asp Glu Arg Phe Asp Gly Leu Ile Leu Val Val Cys Leu	195		200		205
15	Gln Asn Trp Pro Glu Asn Lys Pro Glu Asp Thr Ser Glu Leu Val Ser	210		215		220
20	Ala Gln Leu Ile Ser Ser Ser Ser Phe Val Arg Gln His Gln Ile Pro 225 240		230		235	
25	Val Ile Ala Gly Leu Gly Arg Val Met Pro Leu Glu Pro Glu Glu Leu	245		250		255
30	Glu His Asn Leu Asp Val Leu Phe Glu Tyr Asn Gln Leu Asp Asn Lys	260		265		270
35	Gln Leu Gln His Val Trp Val Ser Gly Leu Asp Glu Gly Thr Ile Glu	275		280		285
40	Asn Leu Met Gln Tyr Ala Glu Gln His Gln Trp Ser Leu Pro Lys Lys	290		295		300
45	Arg Pro Leu His Met Ile Asp His Ser Phe Gly Pro Thr Gly Glu Phe 305 320		310		315	
50						

Ile Phe Pro Val Ser Leu Ala Met Leu Ser Glu Ala Ala Lys Glu
 Thr
 325 330 335

5
 Glu Gln Asn His Leu Ile Ile Tyr Gln Ser Ala Gln Tyr Ala Gln
 Lys
 340 345 350

10
 Lys Ser Leu Cys Leu Ile Thr Arg Lys Leu Tyr Leu Arg Thr
 355 360 365

15 <210> 60 <211> 260 <212> PRT <213> Escherichia coli <400>
 60

Met Leu Asn Arg Lys Leu Asn Ile Arg Leu Arg His Ser Leu Asn
 Ser
 20 1. 5 10 15

His Cys Ile Pro Ser Ile Ile Ile Asn Asn Thr Val Arg Ser Phe
 Gln
 25 20 25 30

Arg Ser Val Met Asn Thr Arg Ala Leu Phe Pro Leu Leu Phe Thr
 Val
 30 35 40 45

Ala Ser Phe Ser Ala Ser Ala Gly Asn Trp Ala Val Lys Asn Gly
 Trp
 35 50 55 60

Cys Gln Thr Met Thr Glu Asp Gly Gln Ala Leu Val Met Leu Lys
 Asn
 40 65 70 75 80

Gly Thr Ile Gly Ile Thr Gly Leu Met Gln Gly Cys Pro Asn Gly
 Val
 45 85 90 95

Gln Thr Leu Leu Gly Ser Arg Ile Ser Ile Asn Gly Asn Leu Ile
 Pro
 50 100 105 110

<210> 61 <211> 385 <212> PRT <213> Escherichia coli <400>
61

5	Val Pro 1	Val	Ile	Ile	Asn	Ser	Thr	Ile	Leu	Ser	Gly	Ala	Gly	Ala	Ile	
					5					10					15	
10	Ser Thr	Leu	Thr	Ser	Leu	Leu	Pro	Asp	Ile	Arg	Lys	Met	Leu	Leu	Val	
				20					25					30		
15	Asp Leu	Arg	Asn	Ile	Ala	Gln	Leu	Asp	Gly	Val	Gln	Gln	Ile	Arg	Ala	
			35					40					45			
20	Leu Ala	Glu	Lys	His	Cys	Pro	Gln	Val	Asn	Val	Ile	Asp	Asn	Val	Pro	
		50					55					60				
25	Glu Asp 65	Pro	Thr	His	His	Asp	Val	Arg	Gln	Leu	Met	Asp	Ala	Pro	Gly	
						70					75				80	
30	Ala Asp	Ser	Phe	Asp	Val	Val	Val	Gly	Ile	Gly	Gly	Gly	Ser	Val	Leu	
					85					90					95	
35	Val Leu	Ala	Lys	Leu	Leu	Ser	Val	Leu	Cys	His	Pro	Gln	Ser	Pro	Gly	
				100					105					110		
40	Asp Trp	Ala	Leu	Leu	Ala	Gly	Glu	Lys	Pro	Thr	Gln	Arg	Val	Gln	Ser	
			115					120					125			
45	Leu Ala	Ile	Pro	Thr	Thr	Ala	Gly	Thr	Gly	Ser	Glu	Ala	Thr	Pro	Asn	
		130					135					140				
50	Ile Gln	Leu	Ala	Ile	Pro	Glu	Gln	Ser	Thr	Lys	Val	Gly	Ile	Ile	Ser	

145		150		155
160				
5	Val Leu Leu Pro Asp Tyr Val Ala Leu Phe Pro Glu Leu Thr Thr			
	Ser			
		165	170	175
10	Met Pro Ala His Ile Ala Ala Ser Thr Gly Ile Asp Ala Leu Cys			
	His			
		180	185	190
15	Leu Leu Glu Cys Phe Thr Ala Thr Val Ala Asn Pro Val Ser Asp			
	Asn			
		195	200	205
20	Ala Ala Leu Thr Gly Leu Ser Lys Leu Phe Arg His Ile Gln Pro			
	Ala			
		210	215	220
25	Val Asn Asp Pro Gln Asp Leu Arg Ala Lys Leu Glu Met Leu Trp			
	Ala			
	225	230	235	
	240			
30	Ser Tyr Tyr Gly Gly Val Ala Ile Thr His Ala Gly Thr His Leu			
	Val			
		245	250	255
35	His Ala Leu Ser Tyr Pro Leu Gly Gly Lys Tyr His Leu Pro His			
	Gly			
		260	265	270
40	Val Ala Asn Ala Ile Leu Leu Ala Pro Cys Met Ala Phe Val Arg			
	Pro			
		275	280	285
45	Trp Ala Val Glu Lys Phe Ala Arg Val Trp Asp Cys Ile Pro Asp			
	Ala			
		290	295	300
50				

Glu Thr Ala Leu Ser Ala Glu Glu Lys Ser His Ala Leu Val Thr
 Trp
 305 310 315
 320

5

Leu Gln Ala Leu Val Asn Gln Leu Lys Leu Pro Asn Asn Leu Ala
 Ala
 325 330 335

10

Leu Gly Val Pro Pro Glu Asp Ile Ala Ser Leu Ser Glu Ala Ala
 Leu
 340 345 350

15

Asn Val Lys Arg Leu Met Asn Asn Val Pro Cys Gln Ile Asp Leu
 Gln
 355 360 365

20

Asp Val Gln Ala Ile Tyr Gln Thr Leu Phe Pro Gln His Pro Phe
 Lys
 370 375 380

25

Glu
 385

30

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Met Asn Ile Arg Lys Leu Phe Cys Pro Gly Asn Thr Pro Arg Ile
 Leu
 1 5 10 15

35

Leu Phe Leu Phe Phe Phe Val Val Ser Ala Ile Thr Thr Ile Ala
 Cys
 20 25 30

40

Gly Tyr Thr Glu Lys Asn Ala Thr Gly Asn Val Leu Leu Leu Phe
 Leu
 35 40 45

45

Leu Leu Leu Leu Ala His Arg Asn Thr Leu Thr Ser Ile Thr Ala
 Leu
 50 55 60

50

5 Leu Phe Leu Phe Cys Cys Ala Leu Tyr Ala Pro Ala Gly Met Thr
 Tyr
 65 70 75 80

10 Gly Lys Ile Asn Asn Ser Phe Ile Val Ala Leu Leu Gln Thr Thr
 Thr
 85 90 95

15 Asp Glu Ala Ala Glu Phe Thr Gly Met
 100 105

<210> 63 <211> 147 <212> PRT <213> Escherichia coli <400>
 63

20 Met Asn Ile Gln Ala Ile Lys Glu Met Val Asn Leu Ile Cys Ser
 Phe
 1 5 10 15

25 Leu Phe Ile Phe Phe Leu Ser Ser Ala Phe Val Ser Phe Gly Cys
 Tyr
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30 Ala Ile Tyr Glu Leu Phe Leu Trp Asn Asp Ile Ile Val Tyr Ser
 Trp
 35 40 45

35 Gly Tyr Ile Leu Ile Val Phe Leu Pro Phe Thr Leu Tyr Val Met
 Ser
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40 Phe Glu Ile Leu Phe Phe Ala Ile Ser Gly Arg Arg Leu Ser Lys
 Val
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45 Thr Met Val Arg Leu Trp Leu Ile Ile Lys Ile Ile Ile Ala Phe
 Ser
 85 90 95

50 Ile Cys Ala Val Leu Ile Phe Ser Ser Ile Tyr Lys Lys Glu Leu
 Leu

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30	Glu Ser Lys Ser Val Ala Ser Ala Val Phe Tyr Lys Gln Ile Lys Ile	35	40 45
35	Leu His Leu Asp Phe Phe Ser Arg Ser Ala Leu Asn Thr Asp Ala Glu	50	55 60
40	Asp Thr Pro Leu Ser Thr Met Val His Val Trp Gln Leu Lys Thr Arg	65	70 75 80
45	Glu Asp Phe Asp Lys Ala Asp Tyr Asp Thr Leu Phe Met Gln Glu Glu	85	90 95
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Lys Thr Leu Glu Lys Asp Val Leu Ala Lys His Thr Val Trp Val
 Lys
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5 Pro Glu Gly Thr Ala Ser Leu Asn Val Pro Leu Asp Lys Glu Thr
 Gln
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10 Phe Val Ala Ile Ile Gly Gln Phe Tyr His Pro Asp Glu Lys Ser
 Asp
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15 Ser Trp Arg Leu Val Ile Lys Arg Asp Glu Leu Glu Ala Asp Lys
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15	Lys Met Asn Ile Phe Thr Leu Ser Lys Ala Pro Leu Tyr Leu Leu			
	Ile			
		35	40	45
20	Ser Leu Phe Leu Pro Thr Met Ala Met Ala Ile Asp Pro Pro Glu			
	Arg			
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25	Glu Leu Ser Arg Phe Ala Leu Lys Thr Asn Tyr Leu Gln Ser Pro			
	Asp			
		65	70	75
				80
30	Glu Gly Val Tyr Glu Leu Ala Phe Asp Asn Ala Ser Lys Lys Val			
	Phe			
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35	Ala Ala Val Thr Asp Arg Val Asn Arg Glu Ala Asn Lys Gly Tyr			
	Leu			
		100	105	110
40	Tyr Ser Phe Asn Ser Asp Ser Leu Lys Val Glu Asn Lys Tyr Thr			
	Met			
		115	120	125
45	Pro Tyr Arg Ala Phe Ser Leu Ala Ile Asn Gln Asp Lys His Gln			
	Leu			
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50	Tyr Ile Gly His Thr Gln Ser Ala Ser Leu Arg Ile Ser Met Phe			
	Asp			

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	Val			
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15	Tyr Ser Gln Asp Ser Asp Thr Leu Phe Val Ser Tyr Ser Asn Met			
	Leu			
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	Asp			
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	Gly			
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	240			
30	Thr Ala Tyr Gly Leu Thr Met Asp Glu Lys Thr Gln Lys Ile Tyr			
	Val			
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35	Gly Gly Arg Asp Tyr Ile Asn Glu Ile Asp Ala Lys Asn Gln Thr			
	Leu			
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40	Leu Arg Thr Ile Pro Leu Lys Asp Pro Arg Pro Gln Ile Thr Ser			
	Val			
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45	Gln Asn Leu Ala Val Asp Ser Ala Ser Asp Arg Ala Phe Val Val			
	Val			
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 320
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 Gly
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Ala Asn Ala Val Lys Tyr Asn Pro Lys Tyr Asn Glu Leu Tyr Val
 Thr
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Asn Phe Thr Ser Gly Thr Ile Ser Val Val Asp Ala Thr Lys Tyr
 Ser
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Ile Thr Arg Glu Phe Asn Met Pro Val Tyr Pro Asn Gln Met Val
 Leu
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gggaacgtta 420

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40 agctgattcg 300

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cctgaagaat 360

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30 catgatgatt 720

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20 aactttggca gccagggtaa aggttcgatg gtgctcgaag gctacacgga
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tgtttccgcc 300

25 acggaacgcc attaccgcat cagccagtgg gaatccagcg cctcatcgat
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cgggctgttc 420

30 ctcaacgccc agaagctgaa cgataaagcg attttgctca gttctattaa
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45 aatacaagcg acaaagactt agcagtaact ttaccactg ttgccacttc
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ttgtgcaact 240

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cattgactta 300

5 gctacacata atttaaaaaa tactgctact ccaactaaag cggataatgt
acagattcag 360

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tgggcaagat 420

10 gtccagtctg agacaatcgg atctgatgga agtgccacat tgcgttatat
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ggcggaaca 180

30 agtaaccagt atgttttttaa tggcggtgcc atcgctctga tgcgtggaaa
gtttacaccc 240

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35 gcgtgattca 300

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tattgaccct 420

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 attgacctta 840
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 gcacttctcc 960
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 gactttaagg 420
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 50 tatttcccct 480

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 ctattaccag 540

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 agcacaattc 720

15 acattagggg atttttatac gaatgggtgag ctaatggata gcctcagttt
 gcggggagtc 780

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 tggatatgct 960

25 ggtgaccttc tcgttaagat aacagagtct aatggccaga cacgaatgtt
 cacggttcct 1020

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ggtggtcgca 1980

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45 ctcagcgttg tatggggacc agataataaa gacagatgtt catttgtata
tcatgttgca 2460

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aatgataaa 120
- gaaaaagaga tgctcataat gttatcacia catcctgaaa ctgggtactt
tggattttat 180
- 15 tccatagaac ttccggctga ttacaaacca acaggaatgg ttatgttcat
acaaggatcg 240
- gcatgatgcc ctgtagaaac aaagctacaa tattatcctc cttttctgca
20 atatatgaca 300
- cgatatgagg cagaactaaa aaacacctca gcattagatc cactggatac
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- 25 aagcaagttc acccactaag tccacctatg aatggagtca tttttgaacg
aatgaaagcg 420
- aaatacaccc cagattttgc acgagtattg gatgcatgga aatgggaaaa
tggcggttacg 480
- 30 ttttcagtaa aaatagaagc taaagatggg agagcaaccc gctatgatgg
aattagtaag 540
- attgccgaat acagttatgg atataatatt ccagaaaaaa aagtacagtt
35 acttactatt 600
- ctttcaggac tacaacctcg tgcagataac caacccccat cagaaaataa
attggcgata 660
- 40 caatatgcac aggttgacgc ttcactactt ggagagtatg aattatctgt
agattataaa 720
- aatagcaata atattaaaat aagtttgcag acggataata atagttatat
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- 45 ttagatataa gatatccgag taatggaaac agagcatggg ataactctat a
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- 50 <210> 125 <211> 1098 <212> DNA <213> Escherichia coli
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10 gaacaatccg ttgcagcctg tataagttgg gagtctgaaa gacaacaagt
 taaacaactc 240

tggcaacact ggagccaaaa acaactggca atagttggga atgttctttt
 tacaccgaa 300

15 gaaaaaggca tgagtgtttt actggggcca caggaagaga tccctgcata
 tcctaaaaag 360

gcacgaccgt tattctctgc atcccgttat tctctttcgt ctatattcca
 20 tgatattcac 420

cagcaactga cacaacaatt tcctgattat cgtcattatc tacatactat
 ctacgtatta 480

25 cagcctgaga aatggcgtgg agaaacgctg agacaggcta ttttccatca
 atgggaacta 540

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 aagatttgac 600

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 agatacgagt 660

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 35 ccagataccc 720

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 gcataatctg 780

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gctgaaaaat 240

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gacgtcctg 300

25 ggcagccgta tcagtattaa cggtaacctg atcccacat cacaatgtg
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30 acgggattca gggctgttga ggtggaaatc ggacaggcgc cggaaatggt
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40 tacgcccggg aatatgacga ggaaacaaca gaaaCcgctg attttggctc
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15 ctatcgggtgc tttgccatcc acaatcacgg gggctggatg cgctgcttgc
 gggtgaaaaa 360

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25 gtgctgttac cagactatgt ggcgcttttc ccggaactga ccaccagcat
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30 gtggcaaadc cggtcagcga taacgcggcg ctgactgggt taagtaaact
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35 attcaaccgg ccgtgaacga tcctcaggat ctgcgcgcaa aactggaaat
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15 ttttttgttg tttctgcaat aaccacaatt gcatgcggat aactgagaa
gaatgcaaca 120

20 ggaaatgtgc tgcttctggt tctccttctg ctccttgcaac acagaaatac
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cgaatggcta 180

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atatactcca 240

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 ggaaacatta 420

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 gtatgaattt 480

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 ggcatttgat 540

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tgaccgtgcc 900

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gtagtggatg ccaccaaata cagcatcacc cgtgaattta acatgccggt
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30 cagatggtgt tgtcggacga tatggatacc ctttacattg gcatcaaaga
aggctttaac 1200

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50 Val
20 25 30

Val Ala Leu Asp His Asp Val Tyr Ile Pro Thr Asp Asn Asn Thr
 Gly
 5 35 40 45

Lys Leu Thr Gly Thr Arg Thr His Lys Pro Phe Thr Phe Thr Lys
 Glu
 10 50 55 60

Ile Asp Ala Ser Ser Pro Tyr Leu Tyr Lys Ala Val Thr Thr Gly
 Gln
 15 65 70 75 80

Thr Leu Lys Thr Ala Glu Phe Lys Phe Tyr Arg Ile Asn Asp Ala
 Gly
 20 85 90 95

Gln Glu Val Glu Tyr Phe Asn Ile Thr Leu Asp Asn Val Lys Leu
 Val
 25 100 105 110

Arg Val Ala Pro Leu Met His Asp Ile Lys Asp Pro Ser Arg Glu
 Lys
 30 115 120 125

His Asn His Leu Glu Arg Ile Glu Phe Arg Tyr Glu Lys Ile Thr
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 35 130 135 140

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Pro Ser Ala
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 <400> 134
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[illegible]

[illegible]

	Met	Leu	Gly	Val	Thr	Thr	Val	Ala	Gly	Ile	Ala	Ala	Leu	Cys	Leu	
	Ser															
					325					330						335
5																
	Ala	Thr	Ala	Asn	Arg	Gln	Leu	Leu	Arg	Gln	Val	Gly	Asp	Asp	Leu	
	His															
					340					345						350
10																
	Arg	Phe	Tyr	Ala	Val	Pro	Val	Glu	Glu	Phe	Ile	Thr	Lys	Ala	Arg	
	His															
					355					360						365
15																
	Leu	Ser	Val	Leu	Lys	Asp	Asp	Ala	Thr	Met	Leu	Asp	Gly	Tyr	Tyr	
	Arg															
					370					375						380
20																
	Glu	Gly	Glu	Pro	Leu	Arg	Leu	Gly	Leu	Gly	Leu	Tyr	Pro	Gly	Glu	
	Arg															
						385								395		
25																
						400										
	Ile	Arg	Gln	Pro	Val	Leu	Arg	Ala	Ile	Arg	Asp	Trp	Arg	Pro	Pro	
	Glu															
						405									415	
30																
	Gln	Lys	Met	Glu	Val	Thr	Ala	Ser	Leu	Gln	Val	Gln	Thr	Val	Arg	
	Leu															
						420									430	
35																
	Asp	Ser	Met	Ser	Leu	Phe	Asp	Val	Gly	Gln	Ala	Arg	Leu	Lys	Asp	
	Gly															
						435									445	
40																
	Ser	Thr	Lys	Val	Leu	Val	Asp	Ala	Leu	Val	Asn	Ile	Arg	Ala	Lys	
	Pro															
						450									460	
45																
	Gly	Trp	Leu	Ile	Leu	Val	Ala	Gly	Tyr	Thr	Asp	Ala	Thr	Gly	Asp	
	Glu															
						465									475	
50																
						480										

Lys Ser Asn Gln Gln Leu Ser Leu Arg Arg Ala Glu Ala Val Arg
 Asn
 5 485 490 495

Trp Met Leu Gln Thr Ser Asp Ile Pro Ala Thr Cys Phe Ala Val
 Gln
 10 500 505 510

Gly Leu Gly Glu Ser Gln Pro Ala Ala Thr Asn Asp Thr Pro Gln
 Gly
 15 515 520 525

Arg Ala Val Asn Arg Arg Val Glu Ile Ser Leu Val Pro Arg Ser
 Asp
 20 530 535 540

Ala Cys Gln Asp Val Lys
 545 550
 25

<210> 135 <211> 194 <212> PRT <213> Escherichia coli
 <400> 135

30 Met Ile Lys Ser Thr Phe Trp Arg Ala Leu Ala Leu Thr Ala Thr
 Leu
 1 5 10 15

35 Ile Leu Thr Gly Cys Ser His Ser Gln Pro Glu Gln Glu Gly Arg
 Pro
 20 25 30

40 Gln Ala Trp Leu Gln Pro Gly Thr Leu Ile Thr Leu Pro Ala Pro
 Gly
 35 40 45

45 Ile Ser Pro Ala Val Asn Ser Gln Gln Leu Leu Thr Gly Ser Phe
 Asn
 50 55 60

50 Gly Lys Thr Gln Ser Leu Leu Val Met Leu Asn Ala Glu Asp Gln
 Lys

	65		70		75		80
5	Ile Thr Leu Ala Gly Leu Ser Ser Val Gly Ile Arg Leu Phe Leu Val	85		90		95	
10	Thr Tyr Asp Ala Lys Gly Leu Arg Ala Glu Gln Ser Ile Val Val Pro	100		105		110	
15	Gln Leu Pro Pro Ala Ser Gln Val Leu Ala Asp Val Met Leu Ser His	115		120		125	
20	Trp Pro Ile Ser Ala Trp Gln Pro Gln Leu Pro Thr Gly Trp Thr Leu	130		135		140	
25	Arg Asp Asn Gly Asp Lys Arg Glu Leu Arg Asn Ala Ser Gly Lys Leu 145 160	150		155			
30	Val Thr Glu Ile Thr Tyr Leu Asn Arg Gln Gly Lys Arg Val Pro Ile	165		170		175	
35	Ser Ile Glu Gln His Val Phe Lys Tyr His Ile Thr Ile Gln Tyr Leu	180		185		190	
40	Gly Asp						
45	<210> 136 <211> 129 <212> PRT <213> Escherichia coli <400> 136						
50	Met Lys Arg Tyr Ile Lys Trp Phe Ala Ile Thr Ile Phe Ile Ser Met 1	5		10		15	

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Leu Ser Ala Cys Val Arg Thr Ala Pro Val Gln Gln Ile Ser Thr
 Thr
 20 25 30

5 Val Ser Val Gly His Thr Gln Glu Gln Val Lys Asn Ala Ile Leu
 Lys
 35 40 45

10 Ala Gly Ala Gln Arg Lys Trp Ile Met Thr Gln Val Ser Pro Gly
 Val
 50 55 60

15 Ile Lys Ala Arg Tyr Gln Thr Arg Asn His Val Ala Glu Val Arg
 Ile
 65 70 75 80

20 Thr Tyr Thr Ala Thr Tyr Tyr Asn Ile Lys Tyr Asp Ser Ser Leu
 Asn
 85 90 95

25 Leu Gln Ala Ser Asp Gly Lys Ile His Lys Asn Tyr Asn Arg Trp
 Val
 100 105 110

30 Arg Asn Leu Asp Lys Asp Ile Gln Val Asn Leu Ser Thr Gly Ala
 Thr
 115 120 125

35 Leu

40 <210> 137 <211> 415 <212> PRT <213> Escherichia coli
 <400> 137

Met Lys Arg Lys His Leu Leu Leu Leu Leu Leu Phe Ser Phe Ser
 Thr
 45 1 5 10 15

Asn Ser Ala Pro Leu Tyr Ser Leu Ile Arg Glu Ala Val Met His
 Asp
 50 20 25 30

Pro Ile Val Met Glu Ala Arg Ala Glu Leu Thr Ser Ala Gln Ser
 Arg
 35 40 45
 5

Ile Glu Gln Ala Ser Ser Ala His Trp Pro Val Val Thr Ala Thr
 Gly
 50 55 60
 10

Ser Lys Leu Leu Ser Gln Ser His Arg Tyr Ser Tyr Asp Tyr Asp
 Thr
 65 70 75 80
 15

Glu Asp Ile Leu Pro Gly Ile Arg Gly Glu Val Asn Ile Phe Ala
 Ser
 85 90 95
 20

Gly Ala Ile Glu Ala Asp Val Arg Arg Ser Glu Ser Glu Ala Glu
 Tyr
 100 105 110
 25

Tyr His Tyr Lys Met Glu Glu Thr Lys Glu Glu Thr Ile His Ser
 Phe
 115 120 125
 30

Val Ser Leu Tyr Leu Asp Ala Leu Arg Glu Lys Gln Ser Ile Ala
 Val
 130 135 140
 35

Leu Glu Gln Ser Leu Ser Arg His Asn Ala Ile Leu Asn Asp Leu
 Asn
 145 150 155
 40 160

Thr Ile Ser Ile His Asp Thr Gly Arg Glu Ser Glu Leu Val Gln
 Ala
 165 170 175
 45

Glu Ala Arg Arg Leu Met Val Arg Gln Gln Ile Asn Ser Arg Ser
 Arg
 180 185 190
 50

	Val	Leu	Lys	Thr	Thr	Leu	Gly	Lys	Leu	Ser	Thr	Trp	Thr	Lys	Asn
	Pro														
			195					200					205		
5															
	Val	Thr	Glu	Ala	Asp	Leu	Glu	Asn	Pro	Phe	Ser	Arg	Met	Thr	Glu
	Ala														
		210					215					220			
10															
	Lys	Leu	Leu	Thr	Asp	Phe	Thr	Gln	Ala	Pro	Gln	Lys	Gly	Asn	Pro
	Ser														
	225					230					235				
15	240														
	Trp	Leu	Ala	Ser	Gln	Ala	Asp	Val	Glu	Ser	Lys	Lys	Ala	Ala	Leu
	Lys														
20					245					250				255	
	Ala	Gln	Glu	Leu	Ala	Arg	Tyr	Pro	Arg	Val	Asp	Leu	Thr	Gly	Ser
	Val														
25				260					265					270	
	Thr	Arg	Asp	Asp	Gln	Gln	Ile	Gly	Val	Asn	Leu	Ser	Trp	Asp	Leu
	Phe														
30			275					280					285		
	Asn	Arg	Asn	Ala	Ser	Tyr	Gly	Val	Thr	Glu	Lys	Ala	Ala	Gln	Ile
	Val														
35		290					295					300			
	Ala	Ala	Thr	Gly	Arg	Leu	Asp	Ser	Val	Ala	Arg	Met	Ile	Asp	Glu
	Thr														
40	305					310					315				
	320														
	Gly	Arg	Leu	Ser	Leu	Ile	Thr	Val	Arg	Gln	Ser	Arg	Gly	Glu	Met
45	Glu														
					325					330				335	
	Thr	Leu	Arg	Arg	Gln	Glu	Gln	Ala	Ser	Ala	Arg	Val	Val	Asp	Phe
50	Tyr														
					340				345					350	

Arg Leu Gln Phe Gln Val Ala Arg Lys Thr Leu Ile Glu Leu Leu
 Asn
 5 355 360 365

Ala Glu Asn Glu Leu Tyr Ser Val Gly Leu Ser Arg Val Gln Thr
 Glu
 10 370 375 380

Asp Gln Met Leu His Gly Met Leu Asp Tyr Leu Tyr Ser Gln Gly
 Met
 15 385 390 395
 400

Leu Leu Lys Trp Ser Gly Val Asn Leu Ser Gly Glu Glu Glu Lys
 20 405 410 415

<210> 138 <211> 201 <212> PRT <213> Escherichia coli
 <400> 138

25

Met Lys Phe Leu Pro Leu Leu Ala Leu Leu Ile Ser Pro Phe Val
 Ser
 1 5 10 15

30

Ala Leu Thr Leu Asp Asp Leu Gln Gln Arg Phe Thr Glu Gln Pro
 Val
 20 25 30

35

Ile Arg Ala His Phe Asp Gln Thr Arg Thr Ile Lys Asp Leu Pro
 Gln
 35 40 45

40

Pro Leu Arg Ser Gln Gly Gln Met Leu Ile Ala Arg Asp Gln Gly
 Leu
 50 55 60

45

Leu Trp Asp Gln Thr Ser Pro Phe Pro Met Gln Leu Leu Leu Asp
 Asp
 65 70 75 80

50

Lys Arg Met Val Gln Val Ile Asn Gly Gln Pro Pro Gln Ile Ile
 Thr
 85 90 95

5
 Ala Glu Asn Asn Pro Gln Met Phe Gln Phe Asn His Leu Leu Arg
 Ala
 100 105 110

10
 Leu Phe Gln Ala Asp Arg Lys Val Leu Glu Gln Asn Phe Arg Val
 Glu
 115 120 125

15
 Phe Ala Asp Lys Gly Glu Gly Arg Trp Thr Leu Arg Leu Thr Pro
 Thr
 130 135 140

20
 Thr Thr Pro Leu Asp Lys Ile Phe Asn Thr Ile Asp Leu Ala Gly
 Lys
 145 150 155
 160

25
 Thr Tyr Leu Glu Ser Ile Gln Leu Asn Asp Lys Gln Gly Asp Arg
 Thr
 165 170 175

30
 Asp Ile Ala Leu Thr Gln His Gln Leu Thr Pro Ala Gln Leu Thr
 Asp
 180 185 190

35
 Asp Glu His Gln Arg Phe Ala Ala Gln
 195 200

40
 <210> 139 <211> 770 <212> PRT <213> Escherichia coli
 <400> 139

45
 Met Glu Asn Phe Phe Met Lys Asn Ser Lys Val Phe Tyr Arg Ser
 Ala
 1 5 10 15

50
 Leu Ala Thr Ala Ile Val Met Ala Leu Ser Ala Pro Ala Phe Ala
 Thr
 20 25 30

5	Asp Thr	Ser	Thr	Val	Ser	Thr	Asp	Pro	Val	Thr	Leu	Asn	Thr	Glu	Lys	
		35						40					45			
10	Thr Ala	Leu	Asp	Gln	Asp	Val	Val	Ile	Asn	Gly	Asp	Asn	Lys	Ile	Thr	
		50						55				60				
15	Val Phe	Thr	Ile	Glu	Thr	Ser	Asp	Ser	Asp	Lys	Asp	Leu	Asn	Val	Thr	
	65					70					75				80	
20	Gly Val	Gly	His	Asp	Ile	Thr	Ala	Ala	Ser	Thr	Val	Asn	Gln	Asp	Phe	
					85					90					95	
25	Glu Thr	Gly	Val	Lys	Val	Ser	Gly	Asn	Lys	Asn	Val	Val	Ile	Asn	Ala	
				100					105					110		
30	Asp Ala	Ser	Thr	Ile	Thr	Ala	Gln	Gly	Glu	Gly	Thr	Tyr	Val	Arg	Thr	
			115						120					125		
35	Met Phe	Val	Ile	Asp	Ser	Thr	Gly	Asp	Val	Val	Val	Asn	Gly	Gly	Asn	
		130						135					140			
40	Val Ala	Ala	Lys	Asn	Glu	Lys	Gly	Ser	Ala	Thr	Gly	Ile	Ser	Leu	Glu	
	145					150					155					
	160															
45	Thr Gln	Thr	Gly	Asn	Asn	Leu	Thr	Leu	Asn	Gly	Thr	Thr	Ile	Asn	Ala	
					165					170				175		
50	Gly Lys	Asn	Lys	Ser	Tyr	Ser	Asn	Gly	Ser	Thr	Ala	Ile	Phe	Ala	Gln	
				180					185					190		

5	Gly Asn Leu Leu Gln Gly Phe Asp Gly Asp Ala Thr Asp Asn Ile Thr	195	200	205
10	Leu Ala Asp Ser Asn Ile Ile Asn Gly Gly Ile Glu Thr Ile Val Thr	210	215	220
15	Ala Gly Asn Lys Thr Gly Ile His Thr Val Asn Leu Asn Ile Lys Asp	225	230	235
	240			
20	Gly Ser Val Ile Gly Ala Ala Asn Asn Lys Gln Thr Ile Tyr Ala Ser	245	250	255
25	Ala Ser Ala Gln Gly Ala Gly Ser Ala Thr Gln Asn Leu Asn Leu Ser	260	265	270
30	Val Ala Asp Ser Thr Ile Tyr Ser Asp Val Leu Ala Leu Ser Glu Ser	275	280	285
35	Glu Asn Ser Ala Ser Thr Thr Thr Asn Val Asn Met Asn Val Ala Arg	290	295	300
40	Ser Tyr Trp Glu Gly Asn Ala Tyr Thr Phe Asn Ser Gly Asp Lys Ala	305	310	315
	320			
45	Gly Ser Asp Leu Asp Ile Asn Leu Ser Asp Ser Ser Val Trp Lys Gly	325	330	335
50	Lys Val Ser Gly Ala Gly Asp Ala Ser Val Ser Leu Gln Asn Gly Ser			

		340		345		350
5	Val Trp Asn Val Thr Gly Ser Ser Thr Val Asp Ala Leu Ala Val					
	Lys	355		360		365
10	Asp Ser Thr Val Asn Ile Thr Lys Ala Thr Val Asn Thr Gly Thr					
	Phe	370		375		380
15	Ala Ser Gln Asn Gly Thr Leu Ile Val Asp Ala Ser Ser Glu Asn					
	Thr					
	385		390		395	
	400					
20	Leu Asp Ile Ser Gly Lys Ala Ser Gly Asp Leu Arg Val Tyr Ser					
	Ala					
		405		410		415
25	Gly Ser Leu Asp Leu Ile Asn Glu Gln Thr Ala Phe Ile Ser Thr					
	Gly					
		420		425		430
30	Lys Asp Ser Thr Leu Lys Ala Thr Gly Thr Thr Glu Gly Gly Leu					
	Tyr					
		435		440		445
35	Gln Tyr Asp Leu Thr Gln Gly Ala Asp Gly Asn Phe Tyr Phe Val					
	Lys					
		450		455		460
40	Asn Thr His Lys Ala Ser Asn Ala Ser Ser Val Ile Gln Ala Met					
	Ala					
	465		470		475	
	480					
45	Ala Ala Pro Ala Asn Val Ala Asn Leu Gln Ala Asp Thr Leu Ser					
	Ala					
		485		490		495
50						

Arg Gln Asp Ala Val Arg Leu Ser Glu Asn Asp Lys Gly Gly Val
 Trp
 500 505 510

5
 Ile Gln Tyr Phe Gly Gly Lys Gln Lys His Thr Thr Ala Gly Asn
 Ala
 515 520 525

10
 Ser Tyr Asp Leu Asp Val Asn Gly Val Met Leu Gly Gly Asp Thr
 Arg
 530 535 540

15
 Phe Met Thr Glu Asp Gly Ser Trp Leu Ala Gly Val Ala Met Ser
 Ser
 545 550 555
 560

20
 Ala Lys Gly Asp Met Thr Thr Met Gln Ser Lys Gly Asp Thr Glu
 Gly
 565 570 575

25
 Tyr Ser Phe His Ala Tyr Leu Ser Arg Gln Tyr Asn Asn Gly Ile
 Phe
 580 585 590

30
 Ile Asp Thr Ala Ala Gln Phe Gly His Tyr Ser Asn Thr Ala Asp
 Val
 595 600 605

35
 Arg Leu Met Asn Gly Gly Gly Thr Ile Lys Ala Asp Phe Asn Thr
 Asn
 610 615 620

40
 Gly Phe Gly Ala Met Val Lys Gly Gly Tyr Thr Trp Lys Asp Gly
 Asn
 625 630 635
 640

45
 Gly Leu Phe Ile Gln Pro Tyr Ala Lys Leu Ser Ala Leu Thr Leu
 Glu
 645 650 655

Gly Val Asp Tyr Gln Leu Asn Gly Val Asp Val His Ser Asp Ser
 Tyr
 660 665 670
 5

Asn Ser Val Leu Gly Glu Ala Gly Thr Arg Val Gly Tyr Asp Phe
 Ala
 675 680 685
 10

Val Gly Asn Ala Thr Val Lys Pro Tyr Leu Asn Leu Ala Ala Leu
 Asn
 690 695 700
 15

Glu Phe Ser Asp Gly Asn Lys Val Arg Leu Gly Asp Glu Ser Val
 Asn
 705 710 715
 20 720

Ala Ser Ile Asp Gly Ala Ala Phe Arg Val Gly Ala Gly Val Gln
 Ala
 725 730 735
 25

Asp Ile Thr Lys Asn Met Gly Ala Tyr Ala Ser Leu Asp Tyr Thr
 Lys
 740 745 750
 30

Gly Asp Asp Ile Glu Asn Pro Leu Gln Gly Val Val Gly Ile Asn
 Val
 755 760 765
 35

Thr Trp
 770
 40

<210> 140 <211> 660 <212> PRT <213> Escherichia coli
 <400> 140

Met Ser Arg Pro Gln Phe Thr Ser Leu Arg Leu Ser Leu Leu Ala
 Leu
 1 5 10 15
 45

Ala Val Ser Ala Thr Leu Pro Thr Phe Ala Phe Ala Thr Glu Thr
 Met
 50

		20		25		30	
5	Thr Val Thr Ala Thr Gly Asn Ala Arg Ser Ser Phe Glu Ala Pro Met	35	40	45			
10	Met Val Ser Val Ile Asp Thr Ser Ala Pro Glu Asn Gln Thr Ala Thr	50	55	60			
15	Ser Ala Thr Asp Leu Leu Arg His Val Pro Gly Ile Thr Leu Asp Gly	65	70	75	80		
20	Thr Gly Arg Thr Asn Gly Gln Asp Val Asn Met Arg Gly Tyr Asp His	85	90	95			
25	Arg Gly Val Leu Val Leu Val Asp Gly Val Arg Gln Gly Thr Asp Thr	100	105	110			
30	Gly His Leu Asn Gly Thr Phe Leu Asp Pro Ala Leu Ile Lys Arg Val	115	120	125			
35	Glu Ile Val Arg Gly Pro Ser Ala Leu Leu Tyr Gly Ser Gly Ala Leu	130	135	140			
40	Gly Gly Val Ile Ser Tyr Asp Thr Val Asp Ala Lys Asp Leu Leu Gln	145	150	155			
		160					
45	Glu Gly Gln Ser Ser Gly Phe Arg Val Phe Gly Thr Gly Gly Thr Gly	165	170	175			
50	Asp His Ser Leu Gly Leu Gly Ala Ser Ala Phe Gly Arg Thr Glu Asn						

	180	185	190
5	Leu Asp Gly Ile Val Ala Trp Ser Ser Arg Asp Arg Gly Asp Leu Arg		
	195	200	205
10	Gln Ser Asn Gly Glu Thr Ala Pro Asn Asp Glu Ser Ile Asn Asn Met		
	210	215	220
15	Leu Ala Lys Gly Thr Trp Gln Ile Asp Ser Ala Gln Ser Leu Ser Gly		
	225	230	235
	240		
20	Leu Val Arg Tyr Tyr Asn Asn Asp Ala Arg Glu Pro Lys Asn Pro Gln		
	245	250	255
25	Thr Val Glu Ala Ser Asp Ser Ser Asn Pro Met Val Asp Arg Ser Thr		
	260	265	270
30	Ile Gln Arg Asp Ala Gln Leu Ser Tyr Lys Leu Ala Pro Gln Gly Asn		
	275	280	285
35	Asp Trp Leu Asn Ala Asp Ala Lys Ile Tyr Trp Ser Glu Val Arg Ile		
	290	295	300
40	Asn Ala Gln Asn Thr Gly Ser Ser Gly Glu Tyr Arg Glu Gln Ile Thr		
	305	310	315
	320		
45	Lys Gly Ala Arg Leu Glu Asn Arg Ser Thr Leu Phe Ala Asp Ser Phe		
	325	330	335
50			

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	Ala	Ser	His	Leu	Leu	Thr	Tyr	Gly	Gly	Glu	Tyr	Tyr	Arg	Gln	Glu
	Gln														
				340					345					350	
5	His	Pro	Gly	Gly	Ala	Thr	Thr	Gly	Phe	Pro	Gln	Ala	Lys	Ile	Asp
	Phe														
			355					360					365		
10	Ser	Ser	Gly	Trp	Leu	Gln	Asp	Glu	Ile	Thr	Leu	Arg	Asp	Leu	Pro
	Ile														
		370					375					380			
15	Thr	Leu	Leu	Gly	Gly	Thr	Arg	Tyr	Asp	Ser	Tyr	Arg	Gly	Ser	Ser
	Asp														
	385					390					395				
	400														
20															
	Gly	Tyr	Lys	Asp	Val	Asp	Ala	Asp	Lys	Trp	Ser	Ser	Arg	Ala	Gly
	Met														
				405					410					415	
25															
	Thr	Ile	Asn	Pro	Thr	Asn	Trp	Leu	Met	Leu	Phe	Gly	Ser	Tyr	Ala
	Gln														
				420					425					430	
30															
	Ala	Phe	Arg	Ala	Pro	Thr	Met	Gly	Glu	Met	Tyr	Asn	Asp	Ser	Lys
	His														
			435					440					445		
35															
	Phe	Ser	Ile	Gly	Arg	Phe	Tyr	Thr	Asn	Tyr	Trp	Val	Pro	Asn	Pro
	Asn														
		450					455					460			
40															
	Leu	Arg	Pro	Glu	Thr	Asn	Glu	Thr	Gln	Glu	Tyr	Gly	Phe	Gly	Leu
	Arg														
	465					470					475				
45	480														
	Phe	Asp	Asp	Leu	Met	Leu	Ser	Asn	Asp	Ala	Leu	Glu	Phe	Lys	Ala
	Ser														
50					485					490					495

	Tyr Phe Asp Thr Lys Ala Lys Asp Tyr Ile Ser Thr Thr Val Asp Phe			
5		500	505	510
	Ala Ala Ala Thr Thr Met Ser Tyr Asn Val Pro Asn Ala Lys Ile Trp			
10		515	520	525
	Gly Trp Asp Val Met Thr Lys Tyr Thr Thr Asp Leu Phe Ser Leu Asp			
15		530	535	540
	Val Ala Tyr Asn Arg Thr Arg Gly Lys Asp Thr Asp Thr Gly Glu Tyr			
20		545	550	555
		560		
	Ile Ser Ser Ile Asn Pro Asp Thr Val Thr Ser Thr Leu Asn Ile Pro			
25		565	570	575
	Ile Ala His Ser Gly Phe Ser Val Gly Trp Val Gly Thr Phe Ala Asp			
30		580	585	590
	Arg Ser Thr His Ile Ser Ser Ser Tyr Ser Lys Gln Pro Gly Tyr Gly			
35		595	600	605
	Val Asn Asp Phe Tyr Val Ser Tyr Gln Gly Gln Gln Ala Leu Lys Gly			
40		610	615	620
	Met Thr Thr Thr Leu Val Leu Gly Asn Ala Phe Asp Lys Glu Tyr Trp			
45		625	630	635
		640		
	Ser Pro Gln Gly Ile Pro Gln Asp Gly Arg Asn Gly Lys Ile Phe Val			
50		645	650	655

Ser Tyr Gln Trp
660

5

<210> 141 <211> 719 <212> PRT <213> Escherichia coli
<400> 141

10 Met Arg Asp Glu Met Leu Tyr Asn Ile Pro Cys Arg Ile Tyr Ile
Leu
1 5 10 15

15 Ser Thr Leu Ser Leu Cys Ile Ser Gly Ile Val Ser Thr Ala Thr
Ala
20 25 30

20 Thr Ser Ser Glu Thr Lys Ile Ser Asn Glu Glu Thr Leu Val Val
Thr
35 40 45

25 Thr Asn Arg Ser Ala Ser Asn Leu Trp Glu Ser Pro Ala Thr Ile
Gln
50 55 60

30 Val Ile Asp Gln Gln Thr Leu Gln Asn Ser Thr Asn Ala Ser Ile
Ala
65 70 75 80

35 Asp Asn Leu Gln Asp Ile Pro Gly Val Glu Ile Thr Asp Asn Ser
Leu
85 90 95

40 Ala Gly Arg Lys Gln Ile Arg Ile Arg Gly Glu Ala Ser Ser Arg
Val
100 105 110

45 Leu Ile Leu Ile Asp Gly Gln Glu Val Thr Tyr Gln Arg Ala Gly
Asp
115 120 125

50 Asn Tyr Gly Val Gly Leu Leu Ile Asp Glu Ser Ala Leu Glu Arg
Val

	130	135	140
5	Glu Val Val Lys Gly Pro Tyr Ser Val Leu Tyr Gly Ser Gln Ala Ile 145 160	150	155
10	Gly Gly Ile Val Asn Phe Ile Thr Lys Lys Gly Gly Asp Lys Leu Ala 165	170	175
15	Ser Gly Val Val Lys Ala Val Tyr Asn Ser Ala Thr Ala Gly Trp Glu 180	185	190
20	Glu Ser Ile Ala Val Gln Gly Ser Ile Gly Gly Phe Asp Tyr Arg Ile 195	200	205
25	Asn Gly Ser Tyr Ser Asp Gln Gly Asn Arg Asp Thr Pro Asp Gly Arg 210	215	220
30	Leu Pro Asn Thr Asn Tyr Arg Asn Asn Ser Gln Gly Val Trp Leu Gly 225 240	230	235
35	Tyr Asn Ser Gly Asn His Arg Phe Gly Leu Ser Leu Asp Arg Tyr Arg 245	250	255
40	Leu Ala Thr Gln Thr Tyr Tyr Glu Asp Pro Asp Gly Ser Tyr Glu Ala 260	265	270
45	Phe Ser Val Lys Ile Pro Lys Leu Glu Arg Glu Lys Val Gly Val Phe 275	280	285
50			

Tyr Asp Thr Asp Val Asp Gly Asp Tyr Leu Lys Lys Ile His Phe
 Asp
 290 295 300

5
 Ala Tyr Glu Gln Thr Ile Gln Arg Gln Phe Ala Asn Glu Val Lys
 Thr
 305 310 315
 320

10
 Thr Gln Pro Val Pro Ser Pro Met Ile Gln Ala Leu Thr Val His
 Asn
 325 330 335

15
 Lys Thr Asp Thr His Asp Lys Gln Tyr Thr Gln Ala Val Thr Leu
 Gln
 340 345 350

20
 Ser His Phe Ser Leu Pro Ala Asn Asn Glu Leu Val Thr Gly Ala
 Gln
 355 360 365

25
 Tyr Lys Gln Asp Arg Val Ser Gln Arg Ser Gly Gly Met Thr Ser
 Ser
 370 375 380

30
 Lys Ser Leu Thr Gly Phe Ile Asn Lys Glu Thr Arg Thr Arg Ser
 Tyr
 385 390 395
 400

35
 Tyr Glu Ser Glu Gln Ser Thr Val Ser Leu Phe Ala Gln Asn Asp
 Trp
 405 410 415

40
 Arg Phe Ala Asp His Trp Thr Trp Thr Met Gly Val Arg Gln Tyr
 Trp
 420 425 430

45
 Leu Ser Ser Lys Leu Thr Arg Gly Asp Gly Val Ser Tyr Thr Ala
 Gly
 435 440 445

50

	Ile Ile Ser Asp Thr Ser Leu Ala Arg Glu Ser Ala Ser Asp His Glu			
	450	455	460	
5				
	Met Val Thr Ser Thr Ser Leu Arg Tyr Ser Gly Phe Asp Asn Leu Glu			
	465	470	475	
10	480			
	Leu Arg Ala Ala Phe Ala Gln Gly Tyr Val Phe Pro Thr Leu Ser Gln			
		485	490	495
15				
	Leu Phe Met Gln Thr Ser Ala Gly Gly Ser Val Thr Tyr Gly Asn Pro			
		500	505	510
20				
	Asp Leu Lys Ala Glu His Ser Asn Asn Phe Glu Leu Gly Ala Arg Tyr			
	515	520	525	
25				
	Asn Gly Asn Thr Trp Leu Ile Asp Ser Ala Val Tyr Tyr Ser Glu Ala			
	530	535	540	
30				
	Lys Asp Tyr Ile Ala Ser Leu Ile Cys Asp Gly Ser Ile Val Cys Asn			
	545	550	555	
35	560			
	Gly Asn Thr Asn Ser Ser Arg Ser Ser Tyr Tyr Tyr Tyr Asp Asn Ile			
		565	570	575
40				
	Asp Arg Ala Lys Thr Trp Gly Leu Glu Ile Ser Ala Glu Tyr Asn Gly			
	580	585	590	
45				
	Trp Val Phe Ser Pro Tyr Ile Ser Gly Asn Leu Ile Arg Arg Gln Tyr			
	595	600	605	
50				

5 Glu Thr Ser Thr Leu Lys Thr Thr Asn Thr Gly Glu Pro Ala Ile
 Asn 610 615 620

10 Gly Arg Ile Gly Leu Lys His Thr Leu Val Met Gly Gln Ala Asn
 Ile 625 630 635
 640

15 Ile Ser Asp Val Phe Ile Arg Ala Ala Ser Ser Ala Lys Asp Asp.
 Ser 645 650 655

20 Asn Gly Thr Glu Thr Asn Val Pro Gly Trp Ala Thr Leu Asn Phe
 Ala 660 665 670

25 Val Asn Thr Glu Phe Gly Asn Glu Asp Gln Ser Arg Ile Asn Leu
 Ala 675 680 685

30 Leu Asn Asn Leu Thr Asp Lys Arg Tyr Arg Thr Ala His Glu Thr
 Ile 690 695 700

35 Pro Ala Ala Gly Phe Asn Ala Ala Ile Gly Phe Val Trp Asn Phe
 705 710 715

40 <210> 142 <211> 199 <212> PRT <213> Escherichia coli
 <400> 142

45 Met Arg Lys Val Cys Ala Val Ile Leu Ser Ala Ala Ile Cys Leu
 Ser
 1 5 10 15

50 Val Ser Gly Ala Pro Ala Trp Ala Ser Glu His Gln Ser Thr Leu
 Ser 20 25 30

Ala Gly Tyr Leu His Ala Arg Thr Asn Ala Pro Gly Ser Asp Asn
 Leu
 35 40 45

5 Asn Gly Ile Asn Val Lys Tyr Arg Tyr Glu Phe Thr Asp Ala Leu
 Gly
 50 55 60

10 Leu Ile Thr Ser Phe Ser Tyr Ala Asn Ala Glu Asp Glu Gln Lys
 Thr
 65 70 75 80

15 His Tyr Ser Asp Thr Arg Trp His Glu Asp Ser Val Arg Asn Arg
 Trp
 85 90 95

20 Phe Ser Val Met Ala Gly Pro Ser Val Arg Val Asn Glu Trp Phe
 Ser
 100 105 110

25 Ala Tyr Ser Met Ala Gly Val Ala Tyr Ser Arg Val Ser Thr Phe
 Ser
 115 120 125

30 Gly Asp Tyr Leu Arg Val Thr Asp Asn Lys Gly Lys Thr His Asp
 Val
 130 135 140

35 Leu Thr Gly Ser Asp Asp Gly Arg His Ser Asn Thr Ser Leu Ala
 Trp
 145 150 155
 160

40 Gly Ala Gly Val Gln Phe Asn Pro Thr Glu Ser Val Thr Ile Asp
 Leu
 165 170 175

45 Ala Tyr Glu Gly Ser Gly Ser Gly Asp Trp Arg Thr Asp Ala Phe
 Ile
 180 185 190

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Val Gly Ile Gly Tyr Arg Phe
195

5 <210> 143 <211> 456 <212> PRT <213> Escherichia coli
<400> 143

Met Lys Lys Ser Thr Leu Ser Leu Ala Ile Gly Leu Leu Leu Ala
Cys
10 1 5 10 15

Ser Thr Gly Met Ala Lys Thr Gln His Leu Thr Leu Glu Gln Arg
Leu
15 20 25 30

Glu Ala Ala Glu Met Arg Ala Ala Lys Ala Glu Gly Gln Val Lys
Gln
20 35 40 45

Leu Gln Thr Gln Gln Ala Ala Glu Ile Arg Glu Ile Lys Thr Ala
Gln
25 50 55 60

Gly Asn Thr Pro Val Asn Gly Gln Ser Thr Thr Glu Ser Glu Lys
Lys
30 65 70 75 80

Asn Ala Thr Pro Pro Asn Leu Leu Leu Ser Gly Tyr Gly Asp Leu
Lys
35 85 90 95

Ile Tyr Gly Asp Val Glu Phe Asn Met Asp Ala Glu Ser Asn His
Gly
40 100 105 110

Leu Leu Ala Met Thr Asn Ala Asp Val Asn Ser Asp Pro Thr Asn
Glu
45 115 120 125

Trp Asn Leu Asn Gly Arg Ile Leu Leu Gly Phe Asp Gly Met Arg
Lys
50 130 135 140

	Leu Asp Asn Gly Tyr Phe Ala Gly Phe Ser Ala Gln Pro Leu Gly	
	Asp	
	145	150 155
5	160	
	Met His Gly Ser Val Asn Ile Asp Asp Ala Val Phe Phe Phe Gly	
	Lys	
10		165 170 175
	Glu Asn Asp Trp Lys Val Lys Val Gly Arg Phe Glu Ala Tyr Asp	
	Met	
15		180 185 190
	Phe Pro Leu Asn Gln Asp Thr Phe Val Glu His Ser Gly Asn Thr	
	Ala	
20		195 200 205
	Asn Asp Leu Tyr Asp Asp Gly Ser Gly Tyr Ile Tyr Met Met Lys	
	Glu	
25		210 215 220
	Gly Arg Gly Arg Ser Asn Ala Gly Gly Asn Phe Leu Val Ser Lys	
	Gln	
30		225 230 235
	240	
	Leu Asp Asn Trp Tyr Phe Glu Leu Asn Thr Leu Leu Glu Asp Gly	
	Thr	
35		245 250 255
	Ser Leu Tyr Asn Asp Gly Asn Tyr His Gly Arg Asp Met Glu Gln	
	Gln	
40		260 265 270
	Lys Asn Val Ala Tyr Leu Arg Pro Val Ile Ala Trp Ser Pro Thr	
	Glu	
45		275 280 285
	Glu Phe Thr Val Ser Ala Ala Met Glu Ala Asn Val Val Asn Asn	
	Ala	
50		290 295 300

	Tyr Gly Tyr Thr Asp Ser Lys Gly Asn Phe Val Asp Gln Ser Asp	
	Arg	
5	305	310 315
	320	
	Thr Gly Tyr Gly Met Ser Met Thr Trp Asn Gly Leu Lys Thr Asp	
10	Pro	
	325	330 335
	Glu Asn Gly Ile Val Val Asn Leu Asn Thr Ala Tyr Leu Asp Ala	
15	Asn	
	340	345 350
	Asn Glu Lys Asp Phe Thr Ala Gly Ile Asn Ala Leu Trp Lys Arg	
20	Phe	
	355	360 365
	Glu Leu Gly Tyr Ile Tyr Ala His Asn Lys Ile Asp Glu Phe Ser	
25	Gly	
	370	375 380
	Val Val Cys Asp Asn Asp Cys Trp Ile Asp Asp Glu Gly Thr Tyr	
30	Asn	
	385	390 395
	400	
	Ile His Thr Ile His Ala Ser Tyr Gln Phe Ala Asn Val Met Asp	
35	Met	
	405	410 415
	Glu Asn Phe Asn Ile Tyr Leu Gly Thr Tyr Tyr Ser Ile Leu Asp	
40	Ser	
	420	425 430
	Asp Gly Asp Lys Ile His Gly Asp Asp Ser Asp Asp Arg Tyr Gly	
45	Ala	
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	Arg Val Arg Phe Lys Tyr Phe Phe	
50	Ala	
	450	455

<210> 144 <211> 174 <212> PRT <213> Escherichia coli
 <400> 144

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Met Asn Gly Lys Ala Phe Leu Ala Cys Val Leu Met Ser Val Val
 Leu
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10

Thr Gly Cys Glu Thr Ala Lys Lys Ile Ser Gln Val Ile Arg Asn
 Pro
 20 25 30

15

Asp Ile Gln Val Gly Lys Leu Met Asp Gln Ser Thr Glu Leu Thr
 Val
 35 40 45

20

Thr Leu Leu Thr Glu Pro Asp Ser Asn Leu Thr Ala Asp Gly Glu
 Ala
 50 55 60

25

Ala Pro Val Asp Val Gln Leu Val Tyr Leu Ser Asp Asp Ser Lys
 Phe
 65 70 75 80

30

His Ala Ala Asp Tyr Asp Gln Val Ala Thr Thr Ala Leu Pro Asp
 Val
 85 90 95

35

Leu Gly Lys Asn Tyr Ile Asp His Gln Asp Phe Asn Leu Leu Pro
 Asp
 100 105 110

40

Thr Val Lys Thr Leu Pro Pro Ile Lys Leu Asp Glu Lys Thr Gly
 Tyr
 115 120 125

45

Ile Gly Val Ile Ala Tyr Phe Ser Asp Asp Gln Ala Thr Glu Trp
 Lys
 130 135 140

50

Gln Ile Glu Ser Val Glu Ser Ile Gly His His Tyr Arg Leu Leu
 Val
 145 150 155
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His Ile Arg Ala Ser Ala Ile Glu Met Lys Lys Glu Glu Asn
 165 170

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 15 Gly
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Pro Lys Trp Thr Leu Tyr Glu Gln His Trp Leu Ala Pro Leu Ala
 20 Asn
 20 25 30

Arg Trp Leu Ala Thr Ala Val Trp Gly Leu Ile Ala Leu Val Trp
 25 Leu
 35 40 45

Thr Trp Arg Val Met Lys Arg Leu Gln Lys Leu Glu Lys Gln Gln
 30 Lys
 50 55 60

Gln Gln Arg Glu Glu Glu Lys Asp Pro Leu Thr Val Glu Leu His
 35 Arg
 65 70 75 80

Gln Gln Gln Tyr Leu Asp His Trp Leu Leu Arg Leu Arg Arg His
 40 Leu
 85 90 95

Asp Asn Arg Arg Tyr Leu Trp Gln Leu Pro Trp Tyr Met Val Ile
 45 Gly
 100 105 110

Pro Ala Gly Ser Gly Lys Ser Thr Leu Leu Arg Glu Gly Phe Pro
 50 Ser
 115 120 125

5	Asp Ile Val Tyr Thr Pro Glu Ser Ile Arg Gly Val Glu Tyr His Pro	130	135	140
10	Leu Ile Thr Pro Arg Val Gly Asn Gln Ala Val Ile Phe Asp Val Asp	145 160	150	155
15	Gly Val Leu Thr Thr Pro Gly Gly Asp Asp Leu Leu Arg Arg Arg Leu	165	170	175
20	Arg Glu His Trp Leu Gly Trp Leu Met Gln Thr Arg Ala Arg Gln Pro	180	185	190
25	Leu Asn Gly Leu Ile Leu Thr Leu Asp Leu Pro Asp Leu Leu Thr Ala	195	200	205
30	Asp Lys Ser Arg Arg Glu Thr Leu Val Gln Asn Leu Arg Gln Gln Leu	210	215	220
35	Gln Glu Ile Arg Gln Ser Leu His Cys Arg Leu Pro Val Tyr Val Val	225 240	230	235
40	Leu Thr Arg Leu Asp Leu Leu Asn Gly Phe Ala Ala Leu Phe His Ser	245	250	255
45	Leu Asp Lys Lys Asp Arg Asp Ala Ile Leu Gly Val Thr Phe Thr Arg	260	265	270
50	Arg Ala His Glu Ser Asp Gly Trp Arg Ser Glu Leu Gly Ala Phe Trp			

	275	280	285
5	Gln Thr Trp Val Gln Gln Val Asn Leu Ala Leu Ser Asp Leu Val Leu 290	295	300
10	Ala Gln Thr Gly Ala Ala Pro Arg Ser Ala Val Phe Ser Phe Ser Arg 305 320	310	315
15	Gln Met Gln Gly Thr Gly Glu Ile Val Thr Ala Leu Leu Ala Ala Leu 325	330	335
20	Leu Asp Gly Glu Asn Met Asp Val Met Leu Arg Gly Val Trp Leu Thr 340	345	350
25	Ser Ser Leu Gln Arg Gly Gln Val Asp Asp Ile Phe Thr Gln Ser Ala 355	360	365
30	Ala Arg Gln Tyr Gly Leu Gly Asn Ser Ser Leu Ala Thr Trp Pro Leu 370	375	380
35	Val Glu Thr Thr Pro Tyr Phe Thr Arg Arg Leu Phe Pro Glu Val Leu 385 400	390	395
40	Leu Ala Glu Pro Asn Leu Ala Gly Glu Asn Ser Val Trp Leu Asn Ser 405	410	415
45	Ser Arg Arg Arg Leu Thr Ala Phe Ser Thr Cys Gly Ala Ala Leu Ala 420	425	430
50			

	Ala	Leu	Met	Val	Gly	Ser	Trp	His	His	Tyr	Tyr	Asn	Gln	Asn	Trp
	Gln														
			435					440					445		
5															
	Ser	Gly	Val	Asn	Val	Leu	Ala	Gln	Ala	Lys	Ala	Phe	Met	Asp	Val
	Pro														
			450				455					460			
10															
	Pro	Pro	Gln	Gly	Thr	Asp	Glu	Phe	Gly	Asn	Leu	Gln	Leu	Pro	Leu
	Leu														
	465					470					475				
	480														
15															
	Asn	Pro	Val	Arg	Asp	Ala	Thr	Leu	Ala	Tyr	Gly	Asp	Tyr	Arg	Asp
	His														
				485						490				495	
20															
	Gly	Phe	Leu	Ala	Asp	Met	Gly	Leu	Tyr	Gln	Gly	Ala	Arg	Val	Gly
	Pro														
			500						505					510	
25															
	Tyr	Val	Glu	Gln	Thr	Tyr	Ile	Gln	Leu	Leu	Glu	Gln	Arg	Tyr	Leu
	Pro														
			515					520					525		
30															
	Ser	Leu	Met	Asn	Gly	Leu	Ile	Arg	Asp	Leu	Asn	Ile	Ala	Pro	Pro
	Glu														
		530					535					540			
35															
	Ser	Glu	Glu	Lys	Leu	Ala	Val	Leu	Arg	Val	Val	Arg	Met	Met	Glu
	Asp														
	545				550						555				
40	560														
	Lys	Ser	Gly	Arg	Asn	Asn	Glu	Ala	Val	Lys	Gln	Tyr	Met	Ala	Arg
	Arg														
45					565					570				575	
	Trp	Ser	Asn	Glu	Phe	His	Gly	Gln	Arg	Asp	Ile	Gln	Ala	Gln	Leu
	Met														
50				580					585					590	

	Val	His	Leu	Asp	Tyr	Ala	Leu	Glu	His	Thr	Asp	Trp	His	Ala	Gln	
	Arg															
			595					600					605			
5																
	Gln	Ser	Ser	Asp	Ser	Asp	Ala	Val	Ser	Arg	Trp	Thr	Pro	Tyr	Asp	
	Lys															
			610				615					620				
10																
	Pro	Ile	Ile	Asn	Ala	Gln	Gln	Glu	Leu	Ser	Lys	Leu	Pro	Ile	Tyr	
	Gln															
	625					630					635					
15	640															
	Arg	Val	Tyr	Gln	Thr	Leu	Arg	Thr	Lys	Ala	Leu	Ser	Val	Leu	Pro	
	Ala															
20					645					650					655	
	Asp	Leu	Asn	Leu	Arg	Asp	Gln	Val	Gly	Pro	Thr	Phe	Asp	Asn	Val	
	Phe															
25				660					665					670		
	Val	Ala	Gly	Asn	Asp	Glu	Lys	Leu	Val	Ile	Pro	Gln	Phe	Leu	Thr	
	Arg															
30			675					680					685			
	Tyr	Gly	Leu	Gln	Ser	Tyr	Phe	Val	Lys	Gln	Arg	Glu	Gly	Leu	Val	
	Glu															
35			690				695					700				
	Leu	Thr	Ala	Leu	Asp	Ser	Trp	Val	Leu	Asn	Leu	Thr	Gln	Ser	Val	
	Ala															
40	705					710					715					
	720															
	Tyr	Ser	Glu	Ala	Asp	Arg	Glu	Glu	Ile	Gln	Arg	His	Ile	Thr	Glu	
	Gln															
45					725					730				735		
	Tyr	Ile	Ser	Asp	Tyr	Thr	Ala	Thr	Trp	Arg	Ala	Gly	Met	Asp	Asn	
	Leu															
50																
			740						745					750		

5	Asn Val Arg Asp Tyr Glu Ala Met Ser Ala Leu Thr Asp Ala Leu Glu	755	760	765
10	Gln Ile Ile Ser Gly Asp Gln Pro Phe Gln Arg Ala Leu Thr Ala Leu	770	775	780
15	Arg Asp Asn Thr His Ala Leu Thr Leu Ser Gly Lys Leu Asp Asp Lys	785 800	790	795
20	Ala Arg Glu Ala Ala Ile Asn Glu Met Asp Tyr Arg Leu Leu Ser Arg	805	810	815
25	Leu Gly His Glu Phe Ala Pro Glu Asn Ser Ala Leu Glu Glu Gln Lys	820	825	830
30	Asp Lys Ala Ser Thr Leu Gln Ala Val Tyr Gln Gln Leu Thr Glu Leu	835	840	845
35	His Arg Tyr Leu Leu Ala Ile Gln Asn Ser Pro Val Pro Gly Lys Ser	850	855	860
40	Ala Leu Lys Ala Val Gln Leu Arg Leu Asp Gln Asn Ser Ser Asp Pro	865 880	870	875
45	Ile Phe Ala Thr Arg Gln Met Ala Lys Thr Leu Pro Ala Pro Leu Asn	885	890	895
50	Arg Trp Val Gly Lys Leu Ala Asp Gln Ala Trp His Val Val Met Val			

	900		905		910
5	Glu Ala Val Arg Tyr Met Glu Val Asp Trp Arg Asp Asn Val Val Lys	915	920	925	
10	Pro Phe Asn Glu Gln Leu Ala Asp Asn Tyr Pro Phe Asn Pro Arg Ala	930	935	940	
15	Thr Gln Asp Ala Ser Leu Asp Ser Phe Glu Arg Phe Phe Lys Pro Asp 945 960	950	955		
20	Gly Ile Leu Asp Asn Phe Tyr Lys Asn Asn Leu Arg Leu Phe Leu Glu	965	970	975	
25	Asn Asp Leu Thr Phe Gly Asp Asp Gly Arg Val Leu Ile Arg Glu Asp	980	985	990	
30	Ile Arg Gln Gln Leu Asp Thr Ala Gln Lys Ile Arg Asp Ile Phe Phe	995	1000	1005	
35	Ser Gln Gln Asn Gly Leu Gly Ala Gln Phe Ala Val Glu Thr Val 1010	1015	1020		
40	Ser Leu Ser Gly Asn Lys Arg Arg Ser Val Leu Asn Leu Asp Gly 1025	1030	1035		
45	Gln Leu Val Asp Tyr Ser Gln Gly Arg Asn Tyr Thr Ala His Leu 1040	1045	1050		
50	Val Trp Pro Asn Asn Met Arg Glu Gly Asn Glu Ser Lys Leu Thr 1055	1060	1065		
	Leu Ile Gly Thr Ser Gly Arg Ala Pro Arg Ser Ile Ala Phe Ser				

	1070		1075		1080
5	Gly Pro Trp Ala Gln Phe Arg Leu Phe Gly Ala Gly Gln Leu Thr 1085 1090 1095				
10	Asn Val Thr Ser Asp Thr Phe Asn Val Arg Phe Asn Val Asp Gly 1100 1105 1110				
15	Gly Ala Met Val Tyr Gln Val His Val Asp Thr Glu Asp Asn Pro 1115 1120 1125				
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35	gtggacgttc aggggcgcga aggtagcatc gaagtgggtg cgctggatca cgatgtgtac 120				
40	atcccgaccg acaataacac cggcaaactg accggtaccc gtactcacia gccttttacg 180				
45	tttaccaaag aaatcgatgc gtccagcccg tatctctaca aagctgtgac caccggacag 240				
50	accctgaaaa cggcagaatt taagttttac cgcatacaac atgccgggtca ggaagtggag 300				
	tacttcaaca tcacgcttga taacgtcaag ctggtcagag tcgctccgct tatgcacgac 360				
	atcaaggatc cttccagaga gaagcataac cacctggaac gtattgagtt ccgctacgag 420				
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ggctatcgtt 120

10 ctggcgggtt cgcggttggt gatttatcgg cgcaggcagg cgtggacgga
gatgaccggc 180

15 gatgcggggt tgtcatcgtt gccgcggaa acctaccgac agccggtagt
gctggtctgt 240

ggcgtctgt cgcgcacct gtccactgac agcccggtcc gccagggttc
agaagggtg 300

20 tatctgcatg ttctgatga agaacagctt gtggcgcagg tggagcgatt
gctgaccctt 360

cgcccggtt gggcatcgca gcttgccgtg gcgtatacca tcatgcccgg
catacaccgg 420

25 gatgtggcgg ttctggccgg acggctgcga cggttcgccc acagtatggc
gacggtgctg 480

30 cgtcgggcag gcgtaaacgt cccctggctt ctctggagcg ggctgtccgg
ctcgccgttg 540

ccggaagag cgagttcacc gtggtttacc tgtaccggcg gcgaagttca
gtagcaaca 600

35 tccacagaga ccaccatgcc cgcgcagtgg attgcacaat ccggcgtaca
ggagcgcagt 660

cagcgaactt gttacctgct gaaagctgaa agcctgatgc agtggctgaa
tcttaatgtg 720

40 ctgacggcac tgaacggccc ggaggcgaaa tgtccaccac tggcgatgac
cgtggggctg 780

gtcccctcgt tgcctgcggt ggataacaac ctgtggcagt tgtggatcac
cgccagaacc 840

ggcctgacgc cggatatcgc ggacaccggc acagacgatg cgctgccatt
cccggatgcc 900

50 ctggtacggc agttgccgcg tcagtcgggc tttaccccgc tgcgacgagc
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 cacggcaaatt 1020

5 cgccagttat tacggcaggt cggtgacgat ctgcaccggt tttatgccgt
 cccggtggag 1080

gaattttatca ccaaagcccg tcacctgtcg gtgctgaaag acgatgacgac
 catgctcgat 1140

10 ggggtattacc gggaaggaga acccctgcgc ctcggtctgg gggtataccc
 cggcgaacgc 1200

15 atccgccagc cgggtattacg cgccattcgc gactggcgct ccctgaaca
 aaaaatggag 1260

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 gtttgacgctc 1320

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 cggcgatgaa 1440

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 gatgctgcag 1500

30 accagcgaca tcccggccac ctgtttttgcc gtacaggggac tgggcgagag
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gcgaccaacg acacgccaca gggccgggca gtcaaccggc gtgtcgaaat
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 acctggtacg 120

ctcatcacgc tgcttgcgcc ggggatttca ccgcagtc attcccagca
 actgttgacc 180

50 ggcagcttca acggcaaaac ccagtctctg ctagtgatgc ttaatgccga
 agatcagaaa 240

atcacccttg cggggtgtc gtcggtcggc attcgctgt ttctggtgac
 ctacgatgca 300

5 aaagggctac gcgccgagca atccatcgtc gtcccacagt taccgcccgc
 aagtcaggta 360

ctggctgacg tgatgctcag ccaactggccg attagcgcct ggcaaccgca
 acttcccaca 420

10 ggctggacgc ttccgcgacaa cggcgacaaa cgcgagctgc gtaacgccag
 cggcaaaactg 480

gtcacggaaa tcacctatct gaatcgccag ggaaaacgcg tgccaatcag
 15 cattgagcag 540

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 tactcaggag 120

caggttaaaa atgccatttt gaaagcaggt gcgcagcgca agtggattat
 30 gacgcaagtg 180

tcccctggag ttattaaagc tcgctatcaa acacgaaatc acgttgcaga
 ggttcgtatt 240

35 acatatacag ctacctacta taacatcaaa tatgacagta gcctgaatct
 gcaggcttct 300

gatggaaaaa ttcataaaaa ctataaccgc tgggtgcgta acctggataa
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 agcccgggcg 120

gagttaactt cggcacaatc ccgcatagag caggcaagct ctgcacattg
 gccagttgtc 180

5 acagctacag gaagtaaact cctttcacaa agtcaccgtt attcctacga
 ttatgacact 240

10 gaagatattt taccgggtat tcgtggtgaa gtgaatatat ttgcttcagg
 ggctattgag 300

gcggatgtgc gtcggagtga gtcagaagcc gaatattatc attataaaat
 ggaagaaaca 360

15 aaagaggaaa caattcactc ttttgtttca ttatatcttg atgcactcag
 ggaaaaacaa 420

tccattgcgg tacttgaaca gagcctttcc cggcataacg caattcttaa
 tgacctgaat 480

20 accatcagta ttcatgatac cgggcgggag tctgagcttg ttcaggccga
 agccagaagg 540

25 ttgatggttc ggcagcagat aaattctagg agcagagtac ttaaaaccac
 gctgggaaaa 600

ctgtccactt ggacaaaaaa tccggtaacc gaagctgac ttgaaaatcc
 ttttctagg 660

30 atgacagagg ccaaattatt aactgatttt acacaggctc cacagaaagg
 taaccgctcg 720

tggcttgcca gccaaagctga tgttgagagt aaaaaagcgg cactgaaagc
 acaggagctt 780

35 gcccggtacc ctcggttgga tttaacgggg tctgtaaccc gggatgacca
 gcagataggg 840

40 gtcaatctgt cttgggacct ctttaaccgt aatgccagtt atgggtgttac
 agaaaaagct 900

gcgcaaatag tggcagctac cggacgactg gactctgtcg ccggaatgat
 tgatgaaacc 960

45 gggcgattat ctctgataac agtcagacaa agtcgagggg aaatggaaac
 gctcagacgt 1020

caggaaacagg cttcagccag agttgtggac ttttatcgtc ttcagtttca
 ggtggcaaga 1080

50 aaaacactga ttgaattact gaatgctgaa aacgaactgt acagtgtcgg
 actctcccgg 1140

gttcagacgg aggatcagat gctccacggt atgctggatt atctgtattc
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cctgac cctg 60

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tgatca aacc 120

cggacg atta aagatctgcc gcagccgctg cgatctcagg gtcagatgtt
gatcgc ccgc 180

20 gaccag ggggt tattgtggga tcaaacctca ccgttcccca tgcagctatt
gctgga tgat 240

aaacgc atgg tgcaggtgat caacggtcag ccgccgcaaa tcatcacggc
agaaaa caac 300

25 ccgcag atgt tccagtttaa ccacctgctg cgcgcgctgt tccaggccga
tcgcaa agtg 360

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cgccgg gaaa 480

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	tggttaacaaa	300			
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35 ctggagcgtg ttgaggtagt gaaagggtcca tattccgtac tgtacgggtc
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15 agagaagaaa 240

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caacgctgat 360

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Gln
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